

Integrating Land Use Issues into Transportation Planning: Scenario Planning

Bibliography



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Abstract:

Over the past 15 years, land use-transportation scenario planning has become an increasingly common technique in regional and sub-regional planning processes. This study investigates the breadth of the technique and some of the themes that are emerging by reviewing 79 scenario planning projects from more than 50 metropolitan areas in the U.S. The study observes some of the trends, articulates and analyzes some of the theoretical constructs behind the practices, and investigates possible implications, especially for complying with mandates requiring alternatives analyses (e.g., NEPA). Products from the study include a summary report, an annotated bibliography, and a digital library.

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Introduction

This bibliography was created as part of a larger project assessing the state of the practice in land use-transportation scenario planning. The object of the project was to note practices and techniques in use in the early portion of the 2000s, and to observe trends or changes in planning processes in the 1980s, 1990s, and 2000s. Research for the project was conducted in 2003-04. In addition to this bibliography, products from the research include a summary report and a digitized library of documents and materials from scenario planning projects in over 50 metropolitan areas dating from the late 1980s through 2004.

Method

The genesis of this bibliography is in a survey conducted 2003 that sought to collect as much information as possible about current and past land use-transportation scenario planning processes in the U.S. The survey was open-ended and designed to maximize the breadth of information about the respondents' knowledge of scenario planning projects in their regions or elsewhere. We sent the survey initially to the planning directors of the 658 member organizations in the National Association of Regional Councils (NARC). Additional surveys were sent to members of the Association of Metropolitan Planning Organizations that were not also members of NARC. One-hundred fifty-two recipients responded, 45% of which indicated that they had direct information on a scenario planning project, or knew of someone who might. A second, slightly different survey was sent to 69 persons or organizations that had been identified by respondents of the first survey. Responses from the two surveys were supplemented by hundreds of emails, telephone calls, and internet searches, resulting in an initial data pool of 153 projects.

This initial pool was subjected to a threshold analysis to determine whether the projects in fact utilized land use-transportation scenario planning techniques. The primary discriminating criterion was whether future land use assumptions in a project were held static or varied across scenarios. Whether the variations were in overall amounts of population and employment growth, in the spatial allocation of that growth, or both, was of secondary importance. The fundamental concern was whether land use was used as a variable in defining future scenarios. A second, and rather obvious, criterion was whether the project included two or more alternatives or scenarios. Those having just one future outcome or forecast were clearly outside of any notion of scenario planning. The threshold analysis indicated a total of 79 projects that met the criteria, a result independently verified by another researcher.

The results from the threshold analysis provide the basis for this bibliography. The objective of the bibliography is to distill basic information that will allow the reader to determine whether a particular project is of interest, and to provide methods for obtaining more detailed data. To accomplish this, each project was subjected to the following six questions:

1. Impetus for the study: *What issues motivated the project sponsor to engage in the study process?*
2. The nature of the scenarios: *What types of land use elements were varied between scenarios (e.g., the overall magnitude of growth; the mix between jobs and households; the location, density, heterogeneity, and/or design of the growth)?*
3. The evaluation process: *What indices were selected to evaluate/compare the scenarios and what technical tools were used to measure those indices?*
4. Evaluation results: *What were the outputs from the evaluation process?*
5. Elected official participation/public involvement: *At what points in the process and in what ways were elected officials and the public involved?*
6. Resulting actions: *What follow-on actions or institutional changes were undertaken by the sponsor or other entities as a result of the study?*

While we attempted to apply a sense of uniformity to how we asked these questions and assessed the responses, the reader will note a certain degree of variation in the entries. In (hopefully) most cases that is due to the nature of the record at hand and the frequent gaps in particular kinds of information.

Also included for each entry are the various basic kinds of bibliographic information that one would expect to find. In addition, we have made extra effort to provide clear, and sometimes multiple, methods for readers to obtain additional information about a particular project. One of those methods is the digital library, mentioned above, which contains at least the summary chapters of almost all of the projects contained in this bibliography. The library is currently maintained at the University of Utah Marriott Library website, and can be found using this URL:

<http://content.lib.utah.edu/cgi-bin/browserresults.exe?CISOROOT=%2FFHWA>

It is anticipated that the Federal Highway Administration will incorporate the data from this library in its own website on scenario planning at some future date.

Limits

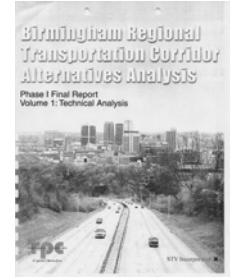
Before moving onto the data, it is incumbent on us to disclose our limitations. First, and foremost, it was innately impossible for us to provide complete information on planning processes or outcomes in any particular location. As outsiders to all of the projects in the database, we could only glimpse at the complexities inherent in every one of these processes. Except in a couple of instances where we had independent personal knowledge of a project, we had to rely almost exclusively on the contents of the written record provided. In some cases, additional information was derived from other sources—personal contact and internet research, mainly—but those circumstances were necessarily limited due to time and resource constraints. Experience teaches us that the reality behind each one of these projects is immensely more intricate than what appears on the page. Inherent in that limitation is the potential for making deductions that are not completely accurate. Certainly, we guarded against that tendency. But we are also aware that we could not eliminate it entirely.

The second limitation is that of breadth. Anytime a researcher attempts to catalogue the extent of a practice or process such as scenario planning, there is the temptation to think that a complete encyclopedia of the subject is possible. We spent many hours attempting to chase down every lead and thread for the purpose of creating the most inclusive record that we could. However, any claims of having definitively identified the entire universe of land use-transportation scenario planning would be insincere and certainly disproved. While this would have been the case under any circumstances, it has been made a certainty by one of the conclusions from this study: scenario planning projects, particularly those utilizing one of the new interactive GIS software packages now on the market, have become too numerous and widespread to catalogue.

The last, and most universal, limitation is that we simply just got things wrong occasionally. Naturally, we tried to guard against and compensate for our frailties, but as humans subject to the normal limits of cognition and perception, we were bound to fail in some (hopefully minor) ways.

Birmingham Regional Transportation Alternatives Analysis

Sponsor: Regional Planning Commission of Greater Birmingham; cities of Birmingham, Hoover, Irondale, Mountain Brook and Vestavia Hills; Jefferson and Shelby county commissions; Birmingham-Jefferson County Transit Authority; Federal Transit Administration



Completion Date: 2002

Planning Horizon: 2025

Source: Phase I Final Report, Vol. I: Technical Analysis

The primary reason for the BRT Alternatives Analysis was to assess the viability for fixed-guideway transit in the Birmingham region. The intro to the analysis notes that of all US regions one million in population or larger, Birmingham has the smallest public transit system and the lowest ridership, but with 60% of Birmingham households having 0 or 1 car, there is a potentially strong transit market. The intro also notes, however, that recently developed land use patterns are suburban, dispersed, auto-oriented, and not suited to high-capacity transit service.

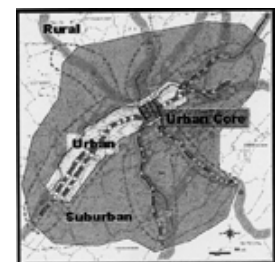
The nature of the scenarios

Three land use scenarios were developed:

Trend: extrapolates past development patterns and projects them forward

Transit Corridor: accommodates 90% of population and 85% of employment growth in corridors served by possible fixed-guideway transit

Northern Beltway: focuses future growth in suburban areas near the interchanges of a possible circumferential freeway.



The analysis assumed the same transportation network across all alternatives: the MPO's 2025 highway network, which includes several system expansions (including a Northern

Beltway), the 2025 transit network, plus bus rapid transit in one radial corridor and light rapid transit in another.

The evaluation process

The scenarios were evaluated according to various land use and transportation measures. Most notably, the land use evaluation relied heavily on “Region 2020,” a wide-ranging regional visioning process that set goals and strategies for the future of the Birmingham region. The Region 2020 process involved more than 1800 citizens of the region and created 34 goals covering topics from environmental protection, to growth and neighborhood issues, to education policy.

On transportation, the analysis assessed VMT, VHT, average speed, congested lane miles, air quality emissions, and vehicle operating costs.

The land use scenarios were created using CorPlan, a model developed through a TCSP grant from FHWA. CorPlan assesses development capacity of existing development patterns, and calculates the capacity of those patterns to absorb new growth using basic development archetypes. The transportation indices were calculated using a locally produced spreadsheet model (TRACI).

The CorPlan model appeared very effective in translating development pattern ideas from the process’ public workshops into realizable scenarios. The TRACI model used for the transportation analysis appeared easy, and seemingly inexpensive, to use. It, however, seemed to have some limitations that resulted in results that were somewhat counter-intuitive (see below).

Evaluation results

The evaluation process indicated that the Transit Corridor scenario would result in substantially lower amounts of land consumption and farm land conversion and that it was the scenario most consistent with the goals of the Region 2020 process. The transportation analysis indicated that the Transit Corridor alternative would significantly reduce VHD, but that the Northern Beltway alternative would reduce VHD by a substantially greater amount. The analysis also showed that VMT and VHT would be greatest in the Transit Corridor alternative.

The VMT and VHT numbers seemed counter-intuitive: with the substantial concentration of households and jobs in the transit corridor, one would expect lower numbers for these measures compared to the other scenarios. There are several possible explanations. First, while an attempt was made at keeping the study area totals for pop and employment constant across alternatives, the Transit Corridor scenario had significantly higher numbers. Second, no attempt was made to craft transportation investments to the strengths of each land use

scenario; e.g., feeder bus networks remained constant across alternatives and were not adjusted to support the land use pattern of each scenario. Third, the TRACI model appears to have had little ability to calculate intra-zonal and non-motorized travel.

The text of the technical report emphasized the reduced VHD figures for the Transit Corridor (but made no mention of the better numbers for the Northern Beltway scenario) and relied on the higher pop and employment number to explain the VMT and VHT numbers. The report also went into a fair amount of detail in demonstrating the Transit Corridor's consistency with the Region 2020 goals.

Scenario	Daily VMT	Daily VHT	Daily VHD	Av. Speed
Trend Line	79,374,897	1,816,729	392,912	43.69
Transit Corridors	83,000,662	1,920,106	329,123	43.23
Northern Beltline	81,014,410	1,863,939	304,003	43.46

Resulting actions

The project sponsors held an additional workshop to address implementation issues. This resulted in an outline of implementing strategies and the basic features of a transit-oriented development overlay zone.

Contact information

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Flagstaff Area Regional Land Use and Transportation Plan

Sponsor: City of Flagstaff & Coconino County

Completion Date: 2003

Planning Horizon: 2020

Source: <http://www.flagstaff.az.gov/documents%5CCommunity%20Development%5CRegional%20Plan/Regional%20Plan%202003.pdf>

The Regional Plan process began in 1996-97 with a visioning/goal setting process titled “Vision 2020,” which established three growth management objectives for the Flagstaff region:

1. Managing and shaping growth in ways that preserve our region’s natural environment, livability and sense of community.
2. Developing and implementing a comprehensive transportation plan addressing both short- and long-term needs, and emphasizing alternative transportation modes.
3. Promoting community design and employing design and standards that reflect the community’s unique history, cultural, and natural and built environments.

The Regional Plan was developed to respond to these mandates.

The nature of the scenarios

As part of the process to develop a regional plan, the city/county planning staff, with assistance from a consultant, developed three future land use scenarios:

Current Trends: assumes “a continuation of current development trends and patterns, similar to that which has occurred over the past 10 years.” This scenario would consume about 13,633 additional acres to accommodate 14,421 housing units with about a 40/60 single family/multi-family split, and an average density of 1.06 dwellings units per gross new developed acre.

Compact Urban Growth: designed to accommodate most of future growth within the limits of the existing Urban Service Boundary. Substantial portions of the growth increment would occur in infill/redevelopment areas. The scenario would consume 9,620 additional acres (29%

fewer than Current Trends) and have an average gross density of 1.53 units/acre (44% higher than Current Trends).

Dispersed Development: “assumes a shift in development patterns towards a lower density, more dispersed pattern” than Current Trends. It would consume 15,851 additional acres, have a 66/34 single/multi-family housing split, and an average gross density of .88 units/acre (17% lower than Current Trends).

Though the scenarios do not test design as a variable, the goals of the Regional Plan include a strong design component.

The evaluation process

The only indices indicated in the documentation is the amount of land consumed by new development, and a little of the qualitative differences in the nature of that development (e.g., dispersed single-family housing developments vs. mixed-use neighborhood development).

Scenarios	Dwelling units per gross acre of new development	Acres of newly developed land
Current Trends	1.06	13,633
Compact Urban Growth	1.53	9,620
Dispersed Development	0.88	15,851

Resulting actions

As indicated above, the scenario testing process was initiated for the purpose of drafting a regional land use-transportation plan. This was accomplished in the fall of 2003.

Implementation of the Regional Plan will depend, in part, on the constituent local governments amending their respective planning/zoning instruments. Given that the two primary governments in the region were the sponsors of the process that resulted in the Regional Plan, making changes to those instruments does not appear to be a major impediment.

Contact information

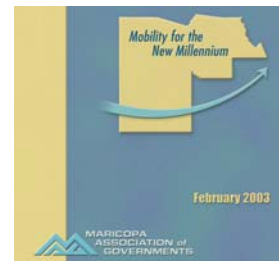
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MAG Regional Transportation Plan: Mobility for the new Millennium

Sponsor: Maricopa Association of Governments

Completion Date: 2002 **Planning Horizon:** 2050

Source: Alternative Growth Concepts—Draft Task Report (Feb 2003):
<http://www.mag.maricopa.gov/pdf/cms.resource/AlternativeGrowthConceptsFinal.pdf>
 Analysis of Alternative Growth Concepts—Draft Task Report (Feb 2003):
<http://www.mag.maricopa.gov/pdf/cms.resource/AnalysisofGrowthConcepts.pdf>



The analysis of alternative growth scenarios was part of the region's effort to update its long-range transportation plan.

The nature of the scenarios

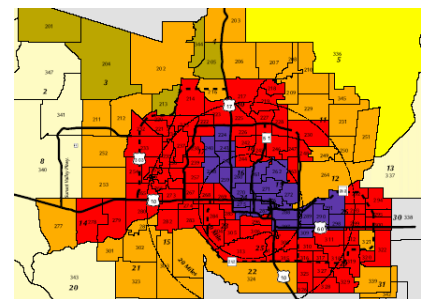
The analysis included four scenarios:

Base Case/General Plan Framework: focuses on continued development according to existing or soon to be adopted general plans in the region.

Infill/Urban Revitalization Emphasis: seeks to maximize use of existing infrastructure by focusing growth in already urbanized areas, especially in fixed-guideway transit corridors.

Activity Center Emphasis: focuses growth in identified activity centers and in transportation corridors.

Suburban Fringe Growth Emphasis: spreads growth in a pattern more dispersed than the Base Case.



The evaluation process

The scenarios were evaluated initially for their respective land consumption impacts at the TAZ level, then qualitatively for their impacts on environmental, transportation, economic, and political values. The scenarios were subsequently modeled to assess their relative quantitative impacts on the region's anticipated future transportation network. The scenarios were built with the aid of GIS software. The quantitative transportation analysis used the region's usual travel forecasting system.

Evaluation results

The Infill/Urban Revitalization scenario showed the lowest vehicle usage in terms of VMT, trip length, and transit boardings (56% higher than the Suburban scenario). However, it showed the same mode split as the Base Case. In fact, all the scenarios posted the same mode split numbers, suggesting some problem with the mode split sub-model.

Scenarios	Av. Trip Length (miles)	PM Peak VHD	Daily Transit Boardings
Base Case/General Plan Framework	10.5	1,833,000	337,000
Infill/Urban Revitalization Emphasis	9.8	1,262,000	446,000
Activity Center Emphasis	10.1	1,427,000	371,000
Suburban Fringe Growth Emphasis	10.3	918,000	286,000

Elected official participation/public involvement

The analysis began with a series of meetings with regional stakeholders to gain understanding of local constraints and opportunities. It appears, however, that the MPO staff defined the scenarios.

Resulting actions

The analysis includes a list of general implementation issues implicated by each scenario, but it does not appear that any further action is imminent. The link to later phases of the RTP planning process was described by staff as follows:

“In the RTP process, the growth concepts and their analysis served as a resource for local governments in evaluating the potential transportation impacts of various growth patterns. This information was available to them as they developed and revised local land use plans. The local plans, in aggregate, provided the basis for developing regional population and employment distribution forecasts that were used in preparing and testing transportation plan alternatives.”

The degree to which local governments altered their general plans in reaction to the information provided through the RTP/Alternative Growth Concepts process is unknown.

Contact information

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North Land Use Plan

Sponsor: City of Phoenix

Completion Date: 1997

Source: North Land Use Plan
[ftp://www.ci.phoenix.az.us/pub/PLANNING/nlup.pdf](http://www.ci.phoenix.az.us/pub/PLANNING/nlup.pdf)



This subregional plan was motivated in part by several controversial zoning cases that came before the Phoenix City Council in the early 90s. The significant issues in the cases included “density, life style, desert preservation, and development character.”

The nature of the scenarios

The five scenarios studied in the plan development process included a trend scenario, a “Desert Character” scenario with about half the residential density, a “Rural Desert Character” scenario with about ¼ of the trend density, a “Desert Preservation A” scenario that used TDR to shift development from fragile lands and increases density on less fragile areas, and a “Desert Preservation B” scenario that maintains the trend densities and relies on acquisition of fragile lands.



The evaluation process

The scenarios were compared for density, housing affordability, school enrollment, infrastructure costs/housing unit, operational costs/housing unit, transportation impacts, and open space preservation.

The analysis was qualitative, relying on generalized assumptions about the relative impacts of different densities. All the scenarios were compared to the trend and were assessed for direction of change, but not magnitude.

The primary benefits of this qualitative approach are that it is simple, inexpensive, and it produces cartoon/graphic information that fits the political needs identified at the beginning of the planning process. Naturally, all this comes at the expense of precision: all the

assessments were based on generalized relationships between density and the impacts on infrastructure, services, and open lands.

Evaluation results

The two lower density scenarios were shown to have higher costs for housing, infrastructure, and operational services, lower school enrollments, lower transportation impacts, and no change in open space. Desert Preservation A was shown to have lower costs for housing, infrastructure, and operational services, higher school enrollments, and more protected open space. Desert Preservation B had mixed housing costs, no change in infrastructure and services, but more protected open space.

Resulting actions

The adopted plan calls for conforming amendments to the city's General Plan and zoning ordinances.

Contact information

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Smart Growth Strategy/Regional Livability Footprint Project

SMART GROWTH STRATEGY REGIONAL LIVABILITY FOOTPRINT PROJECT
SHAPING THE FUTURE OF THE NINE-COUNTY BAY AREA

Sponsor: Bay Area Alliance for Sustainable Development

Completion Date: 2002 **Planning Horizon:** 2020



Source: Smart Growth Strategy/Regional Livability Footprint Project:
Final Report:
http://www.abag.ca.gov/planning/smartgrowth/Publications/Final%20Report/SmartGrowthRpt_final.pdf
Alternatives Report:
<http://www.abag.ca.gov/planning/smartgrowth/Publications/AltsReport/SmartGrowthStrategy.pdf>

The Regional Footprint project was designed to provide regional context and support to the growing number of smart growth projects in the Bay Area. It was also driven by an understanding that trend conditions were unlikely to supply sufficient housing for the region's population, or to achieve the three aims of sustainability: economic growth, social equity, and environmental protection.

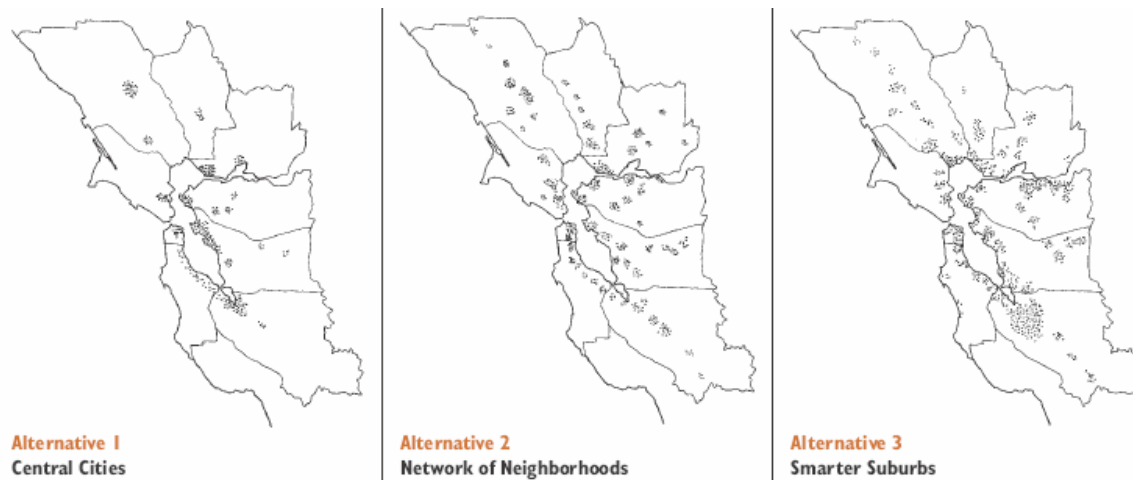
The nature of the scenarios

More than 100 county-wide scenarios were crafted in the public workshops throughout the nine-county region. These were coalesced into 4 region-wide scenarios:

Trend: As in most projects, the Trend Scenarios projects into the future recent development trends in density, development type, and location.

"Participants in all nine county workshops soundly rejected this Base Case future and instead suggested that expected job and housing growth should occur in compact, walkable communities in a variety of already-developed and new locations. Some went further with their land-use scenarios, confining all new growth to areas that are already developed today."





Central Cities: Most of the growth in this scenario is located in the existing urban cores of the region.

Network of Neighborhoods: Development is focused in the urban core areas, but not as densely as in the Central Cities scenario. Growth is also allocated to compact developments in existing non-core communities.

Smarter Suburbs: Development is placed in the core and community areas, but not as densely as in the Network scenario. In addition, growth is allocated to greenfields at the region's edge, but at densities higher and uses more mixed than the typical suburb.

The evaluation process

The indices used to measure the scenarios were VMT, mode split, acres developed, residential water use, and air quality.

PLACE³S software was used in the county-wide workshops to give the participants real time feedback on the impacts of the scenarios they crafted.

The four region-wide scenarios were tested with the region's regular travel demand forecasting system.

As part of the scenario building process, the draft scenarios were analyzed and informed by a housing market analysis to ensure that the resulting options were market feasible.

Evaluation results

Work Trips					
Characteristic	1998 Base Year	2020 Baseline	Central Cities (Alt #1)	Network of Neighborhoods (Alt #2)	Smarter Suburbs (Alt #3)
% Transit	9.4%	10.2%	14.5%	11.2%	10.5%
% Bicycle	1.0%	1.0%	1.3%	1.2%	1.1%
% Walk	2.9%	2.7%	3.9%	3.1%	2.8%
% Drive Alone	73.1%	72.4%	66.2%	70.6%	72.4%
% Carpool	13.7%	13.7%	14.1%	13.9%	13.8%

Vehicle Travel					
Characteristic	1998 Base Year	2020 Baseline	Central Cities (Alt #1)	Network of Neighborhoods (Alt #2)	Smarter Suburbs (Alt #3)
Vehicle Miles of Travel (VMT) (000s)	128,373	174,695	166,652	171,635	176,140
Vehicle Trips (000s)	13,103	16,477	16,229	17,016	17,161
Average Vehicle Trip Length (Miles)	9.8	10.6	10.3	10.1	10.3

Air Emissions					
Characteristic	1998 Base Year	2020 Baseline	Central Cities (Alt #1)	Network of Neighborhoods (Alt #2)	Smarter Suburbs (Alt #3)
Reactive Organic Gases (ROG)	178.40	42.25	40.42	41.93	43.29
Nitrogen Oxides (NOX)	251.37	137.32	134.24	137.01	140.45
Carbon Dioxide (CO ₂)	473.09	608.61	579.92	598.83	616.27
Particulates (PM ₁₀)	7.28	6.58	6.26	6.45	6.63
Carbon Monoxide (CO)	2,044.36	716.86	694.17	715.10	733.91

Generally, the results confirmed the expectations of the participants: more compact growth means less land consumed and a shift toward non-vehicle modes. But the numbers for transportation and air quality mask the fact that there are substantially more (9.3% to 9.6%) households in the non-trend scenarios than in the trend.

The results of the analysis were presented at a second round of public workshops, where participants were charged with choosing/creating a preferred scenario.

Elected official participation/public involvement

The initial impetus for the project came for inter-agency meetings by the five Bay Area regional agencies: MTC, ABAG, Bay Area Air Quality Management District, Bay Conservation and Development Commission, and the Regional Water Quality Control Board.

The first formal step in the project was a series of workshops in each of the 9 Bay Area counties. More than 1000 people participated, including elected officials, agency planners, and environmental and neighborhood activists, as well as regular citizens. About a dozen scenarios were crafted in each workshop, resulting in more than 100 county-wide scenarios for the region.

The project staff crafted the four resulting scenarios, based on the input from the first set of workshops, and presented the draft scenarios to political and business leaders for tweaking. These scenarios were then tested and sent back out for a second round of public, county-wide workshops. At these workshops, participants were tasked with crafting a preferred alternative. The resulting scenario, which closely resembles the Network Scenario, became known as the Smart Growth Strategy.

Resulting actions

The purpose of the Smart Growth Strategy/Footprint project was to support, coordinate, and harness the various smart growth initiatives already occurring around the Bay Area. The intent was to develop a process so that a region-wide smart growth approach could be incorporated into the region's official land use and transportation forecasting system. This, in fact, occurred with the Association of Bay Area Governments' use of the Smart Growth Strategy as the basis for the 2003 Projection, the official economic-land use forecast for the Bay Area. This is the projection that the MPO for the region will use in the next update to its long-range transportation plan. It will also provide the basis for corridor and project level transportation decisions.



Smart Growth Vision

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Regional Alliance for Transit (RAFT)

Sponsor: Regional Alliance for Transit; Metropolitan Transportation Commission

Completion Date: 1994

Source: Lewis III, Sherman L. "Land use and transportation: Envisioning regional sustainability," Transport Policy 5 (1998) 147-161.

RAFT is a transportation policy advocacy organization in the SF Bay region that has lobbied regional transportation officials to promote balanced and environmentally sustainable transportation investments. This alternatives analysis grew out of that broader effort.

The nature of the scenarios

Effectively, there were two scenarios analyzed:

MTC Scenario: MTC's Regional Transportation Plan (1994), which is based land use assumptions, provided by the Association of Bay Area Governments, that maintain current land use plans in the region and project forward trend development practices. The average employees/acre was 21.4 and average persons/acre was 16.7.

RAFT Scenario: Land use assumptions the RAFT scenario include no growth in the region's greenbelt, instead shifting new growth to transit station areas in a mixed-use, pedestrian designed pattern. The average employees/acre was 23.9 and average persons/acre was 20.1.

The RAFT scenario assumed 500 fewer freeway lane miles than the MTC scenario, and substantially increased transit capital facilities and service. The RAFT scenario also included a parking "cash out" policy – offering employees who receive free parking the choice of using the parking or receiving the cash equivalent of the parking benefit (modeled as a \$3.00/day parking charge).

The evaluation process

The indices used to evaluate the scenarios were land consumption and the traditional measures of transportation system performance. The scenarios were run by the MTC staff on the agency's normal travel forecasting model system.

Evaluation results

The results were presented in a comparison format, in both the academic literature and on the organization's website(s), showing the percentage or absolute difference represented by the RAFT Scenario as compared to the MTC Scenario.

Open space saved:	+201 sq. mi.
Bicycle and walking trips:	+397,000
Auto ownership:	-3%
Miles of private vehicle travel:	-6.3%
Cost of vehicle travel/family/yr:	-\$379
Average speed:	no difference
Transit ridership:	+24%
Fuel use:	-128 million gallons
CO (tons/yr):	-6,899
VOC (tons/yr):	-657
NOx (tons/yr):	-1,022

Resulting actions

RAFT was successful in getting MTC to model its scenario, but the agency declined to adopt the scenario as its own.

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North Livermore: Last Change for Smart Growth

Sponsor: Alameda County Planning
Department

Completion Date: 2000

Source: <http://www.transcoalition.org/archives/forum/i/northlivermore.pdf>



This rough analysis was done to support comments on a draft EIR for a proposed large (approx. 12, 500 unit) suburban housing development. The objective of the study was to determine the feasibility of a “smart growth” option to the proposed development.

The nature of the scenarios

The study analyzed three scenarios: (1) a the project as proposed (density of about 6 dua); (2) a “compact” scenario, with 14 dua on the same site; and (3) a “infill/redevelopment” scenario accommodating a comparable amount of number of units in already built areas.

Local street patterns varied among alternatives, but regional systems were constant.

Evaluation results

The Compact scenario would consume less than half of the acreage as the proposed development (876 acres vs. 2023).

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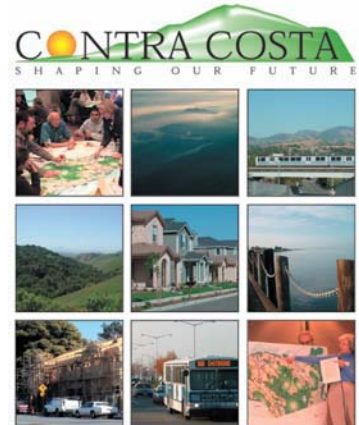
California

Shaping Our Future

Sponsor: Contra Costa County

Completion Date: 2003 **Planning Horizon:** 2025

Source: SOF Report – June 2003
http://www.shapingourfuture.org/docs/SOF_Report.pdf



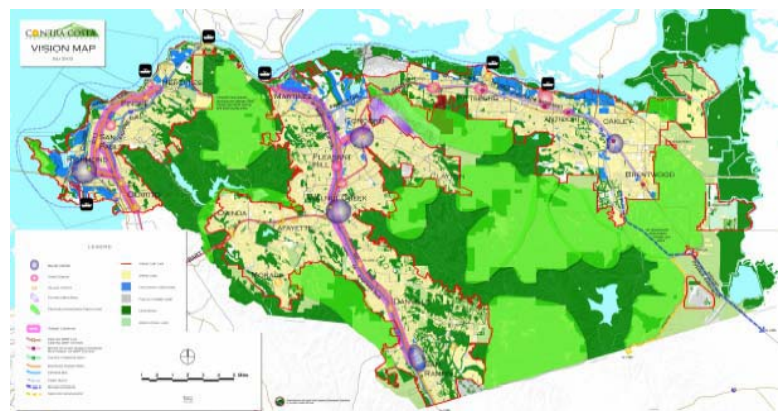
The study process began with a survey of county residents on the most pressing issues facing the county. The results showed that traffic congestion, loss of open space, and air and water pollution were the leading concerns.

The nature of the scenarios

The project studied two scenarios, both using the same amount of household and employment growth:

Trend: extends past recent trends: employment growth focuses on the interstate network, housing is low density.

Shaping Our Future Vision: places substantial amounts of growth in existing urbanized areas, and in the station areas along current and proposed rail transit routes. Conventional large-lot development is also included, but is congregated near the development centers. The Vision scenario was further refined through a stakeholders/citizens workshop process after the scenarios were tested. Transportation system improvements were added in the workshop process to coincide/support the land uses designated in the Vision scenario.



The evaluation process

The scenarios were tested to assess their relative impacts on various transportation measures (VMT, VT, VHT, % of congested roadways, transit ridership) and land consumption.

Buildable vacant lands analysis: To determine the amount of buildable land potentially available for future development, the study team developed a vacant lands map based on satellite imagery, refined by tax assessment data, vacant lands data from the county community development department, recent aerial photos, and interviews with local planners. From this, environmentally constrained lands – open water, riparian zones, wetlands/buffers, floodplains, and steep slopes – were removed.

Scenario building: To develop the land use patterns for the two scenarios, the consultants used the ArcInfo and PLACE³S computer software system. ArcInfo was used to develop the virtual present case condition, and PLACE³S was used to build the scenarios by hand assigning specified development types to the vacant lands map. In the Trend Scenario, staff made judgments on likely extensions of recent development types, densities, and locations; for the Vision Scenario, the staff synthesized input received from the workshops.

Assessing transportation impacts: To test the scenarios' impacts on travel behavior, the study team used the standard travel demand model used by the MPO (the Contra Cost Transportation Authority), combined with a spreadsheet-based "3D" (density, diversity, design) sketch model "to predict travel behavior changes resulting from changes in local land use patterns," especially on the use of non-auto modes. P. 99. The 3D spreadsheet was used to adjust the trip tables in between the mode split and the route assignment steps in the modeling process.

The adjustments were based on elasticities derived from Bay Area household surveys, census data, and neighborhood paired-comparison studies. For each sub-area zone in the study area, the study team established an index measuring population and employment density per acre, the mix of population, retail and non-retail employment, and a pedestrian-friendliness measure of street connectivity, sidewalk coverage, and street density (block size).

After 3D indices were established by sub-zone for each scenario, the percentage differences between the scenarios were calculated, and the corresponding elasticity applied. The results were then summed for each sub-zone. These were then applied to the trip tables, as noted.

Evaluation results

Peak Hour Travel Indicators	Year 2000	Future Baseline	Future SOF Scenario	Change, SOF – Baseline
Vehicle Trips (VT)	229,500	345,100	326,200	-5.5%
Vehicle Miles of Travel (VMT)	1,401,950	2,027,780	1,676,420	-17.3%
Vehicle Hours of Travel (VHT)	42,640	71,800	48,900	-31.9%
Transit Trips	16,050	21,000	24,000	+14.3%
Miles of Freeway Over Capacity	62	113	97	-14.2%
Miles of Arterials Over Capacity	87	144	96	-33.3%

Land Converted (acres)	Agricultural Land	Floodplains	Riparian Zones	Wetland
Trend Buildout	9102	392	237	969
SOF Vision	1481	945	187	1060

Open space acres/1000 people	2000	Trend Buildout	SOF Vision
All open space, including Recreation	187	138	188
Open Space category only	33	25	76

New Development Occurring	Trend Buildout	SOF Vision
on Vacant Land	18,561	11,232
through Redevelopment	4,314	2,355
total	22,875	13,587

The SOF study was instigated to chart a future for Contra Costa County that would reduce impacts on the transportation system and open space. The results of the analysis largely confirmed those aspirations. It is of passing interest that the Vision scenario has almost 50% fewer acres developed through redevelopment than the Trend scenario – frequently, “smart growth” scenarios rely on a higher percentage of redeveloped land than trend conditions.

Elected official participation/public involvement

Project began with a county-wide committee of city/county administrators presenting concerns about future growth issues to a parallel committee of elected officials (the “Mayors’ Conference”). The Mayors’ Conference responded by creating Shaping Our Future.

Subsequent steps included performing a public opinion survey on citizen quality of life concerns, showing traffic congestion, open space loss, and transit service as the leading concerns among respondents. A series of six workshops followed (one county-wide and five sub-regional) at which 600 citizens attended. The participants were asked to locate “development types” on a county map, indicating where growth should go (and where it shouldn’t), what type of growth it should be, and what type/location of transportation improvements should be used to support it. The resulting maps from the workshops were synthesized into a consensus scenario. After the scenario was tested, additional workshops were held with citizens and local officials to tweak the scenario. The end result was the Vision, which “reflects a broad consensus among local leaders, stakeholders, and the participating public, local planners and transportation experts.” (p. 18).

Resulting actions

The process concluded with the drafting of an inter-governmental “growth management compact” covering 18 substantive and procedural subject areas. Among the substantive areas, there appeared to be significant agreement on the need for, and general location of, a unified urban limit line. The compact also calls for all jurisdictions to include a growth management element in their respective general plans, and to review local planning documents for consistency with the SOF Vision.

The output of the SOF process was woven into the Smart Growth Strategy/Regional Livability Footprint Project sponsored by the Bay Area Alliance for Sustainable Development, and supported by all the region-wide public agencies in the Bay Area. This project, which followed a similar public involvement and analytical process, resulted in a region-wide consensus-based growth strategy that formed the basis (in 2003) for the official population/employment/land use forecast for the region. That forecast will provide inputs for the region’s next long-range transportation plan, due to be adopted in 2005. It will also provide the basis for corridor and project level transportation decisions.

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California

Alternatives for Future Urban Growth in California's Central Valley

Sponsor: American Farmland Trust

Completion Date: 1995

Planning Horizon: 2040

Source: "Alternatives for Future Urban Growth in California's Central Valley"

The project was driven by concern about the impacts of rapid growth in the Central Valley on farmland preservation and agricultural production.

The nature of the scenarios

Two scenarios were studied for the 11-county Central Valley region:

Low-Density Urban Sprawl: based on recent past development trends; assumes that all new growth will be on open land at fringes of the urban area, at an average residential density of 3 units per acre.

Compact, Efficient Growth: assumes 10% of the new growth will be in-fill and the rest will be at an average residential density of 6 units per acre.

The evaluation process

The primary indices used to compare the scenarios were: (1) acres of farmland lost to development; (2) resulting reductions in agricultural commodity sales; and (3) costs for public infrastructure and services.

To create likely future development patterns, the project researchers used a statistical model that correlated actual development patterns between 1982-92 with the characteristics of individual, undeveloped tracts. The agricultural land impacts were estimated by assessing the type of crops likely to be impacted by the future development patterns. Per acre averages were then applied to the lost acre figures, by crop type. These figures were then used in an input-output model to determine concomitant declines in farm-related economic activities.

The strength of the land consumption model was that it provided a relatively simple projection of past development trends, which was politically understandable and compelling. The simplified approach, of course, could only provide an example of possible future

development patterns, not a reliable projection. A more sophisticated land use model could have provided a more accurate projection, but at a much higher cost in time and money.

Evaluation results

The Urban Sprawl scenario was estimated to result in more than 1 million acres of farmland converted to development and another 2.5 million underutilized due to conflicts with surrounding residential land uses. This would result in losses of approximately \$2 billion in farm products and almost 40,000 farm and farm-related jobs. It would also result in a projected \$985 million deficit in costs of public infrastructure and services compared to anticipated tax revenue.

The Compact Growth scenario was estimated to result in less than 500,000 acres of converted farmland (54% less), less than \$1 billion in lost farm sales (53% less), 18,500 in lost jobs (53% fewer), and \$217 million net surplus in services costs vs. tax revenues.

Resulting actions

American Farmland Trust used the results of this analysis as part of its effort to build a coalition of farm and business interests (including local homebuilders) to promote compact land use policies with Fresno-area local governments (See AFT, *A Landscape of Choice* (1998))

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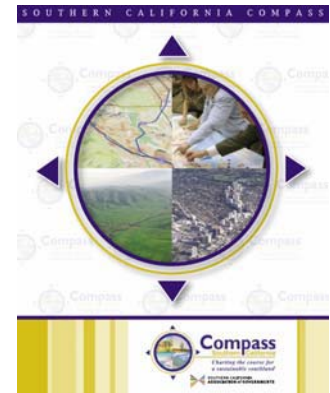
California

Southern California Compass

Sponsor: Southern California Association of Governments

Completion Date: 2004 **Planning Horizon:** 2030

Source: Growth Vision Interim Report (October 2003)
<http://www.socalcompass.org/about/report/pdf/fullreport.pdf>



The Compass project is being driven by concern over high rates of growth combined with physical constraints, and the L.A. region's legendary traffic congestion and polluted air. SCAG estimated that only 29% of new households expected in the region by 2030 could be located on buildable vacant land under current zoning. A public opinion survey conducted at the beginning of the project indicated that over 80% of respondents were somewhat or very concerned about traffic congestion (86%), air pollution (84%), and water pollution (83%). Concerns about crowded schools, water supply, and housing costs followed closely.

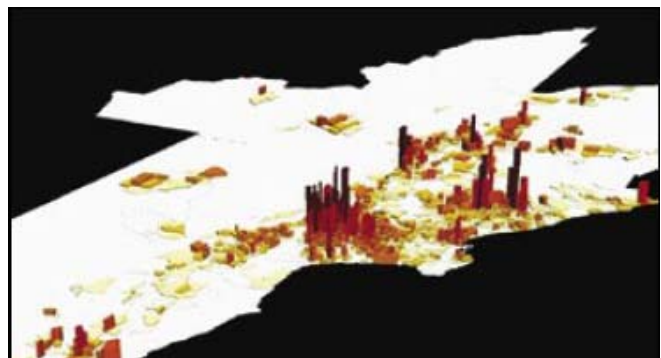
The nature of the scenarios

Three scenarios were used as part of a parallel planning effort to update the RTP. The intention was to develop and analyze a series of staff-created test scenarios that could help inform the public-based scenario development process in Compass. The test scenarios were:

Baseline: a prediction of where the future jobs and people will locate within the region if no policy changes are made.

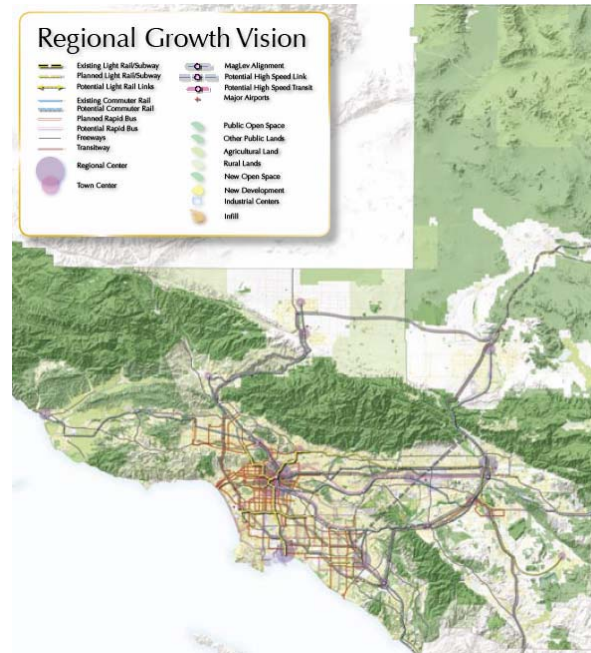
PILUT 1: housing and jobs would be focused on existing centers and corridors ("the majority of the workshop maps employed similar strategies").

PILUT 2: growth would be distributed to the "fifth" or outer ring cities and communities, creating a more poly-centric pattern.



A fourth scenario, the “Growth Vision” scenario was created based on a series of principles established at the beginning of the project (based on principles in the previous RTP), local government existing plans and input, the Compass workshop and survey results, and the PILUT scenarios. The Growth Vision assumed the continuation of trend projections until 2010 to give “ramp-up” time for the necessary implementation policies.

Other than the Baseline scenario, the transportation system was altered to reflect and support the land use components of each scenario. The Baseline scenario included only those projects with federal environmental clearance completed by December 2002.



The evaluation process

The indices used to assess the scenarios were the traditional measures of transportation system performance and air quality, plus calculations of infill/redevelopment, jobs/housing balance, and housing type composition.

SCAG used three models for this project: the SCAG demographic/economics forecasting model, the PLACE³S land use model (for accounting, not predictive, purposes), and the SCAG transportation model.

Evaluation results

Scenarios	Daily VMT	Daily VHD	Daily Transit Boardings
Baseline	487,404,436	3,523,369	2,866,321
PILUT 1	438,631,900	1,937,728	4,064,098
PILUT 2	455,409,842	2,515,331	4,574,669
Growth Vision	469,456,130	2,053,128	4,129,018

For the most part, the analysis showed that the Growth Vision scenario performed somewhere in between the values indicated for the PILUT 1 and 2 scenarios, with the Growth Vision performing closer to PILUT 1 for some measures (such as VHD), closer to PILUT 2 for other measures (such as VHT), and beyond the PILUT 1&2 ‘envelope’ on still others (such as VMT, where it had more than either of the PILUT scenarios).

Elected official participation/public involvement

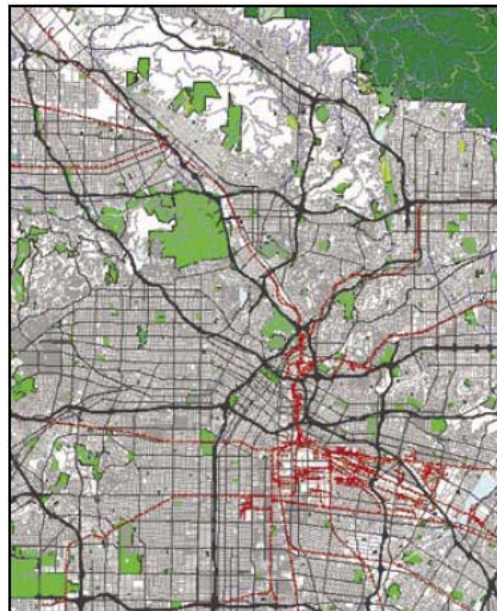
The project began with a public opinion survey of the region's citizens. A series of public workshops followed, where participants played the "chip game" of allocating expected growth (at a sub-regional level) on maps using chips that represented a range of ways that development could be accommodated. "Overall, a surprising majority of workshop participants chose the most intense, mixed-use starter chip set (Chip Set 1). Chip Set 4 often approximated development trends from the 1990s or was slightly more compact. In most subareas, this chip set required the consumption of all the remaining land in the subarea. Out of the 87 workshop groups, no group chose Chip Set 4." The workshop maps were compiled using GIS to identify the location, type, and number of chips.

Resulting actions

SCAG anticipates adopting the final Vision as the forecast for the next RTP.

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Sacramento Region Blueprint



Sponsor:	Sacramento Area Council of Governments & Valley Vision		
Completion Date:	2004	Planning Horizon:	2050
Source:	Special Report: Preferred Blueprint Alternative (Jan 2005) http://www.sacregionblueprint.org/sacregionblueprint/the_project/BP_Insert_JAN_2005.pdf Tall Order Forum: Regional Statistics by Sub-Area (2004) http://www.sacog.org/forum2004/forumbook/forumbook.pdf		

Sacramento Region Blueprint was driven by concern about dispersed future growth patterns, housing, transportation, air quality, and insufficient land to accommodate expected growth by 2050 at recent trends.

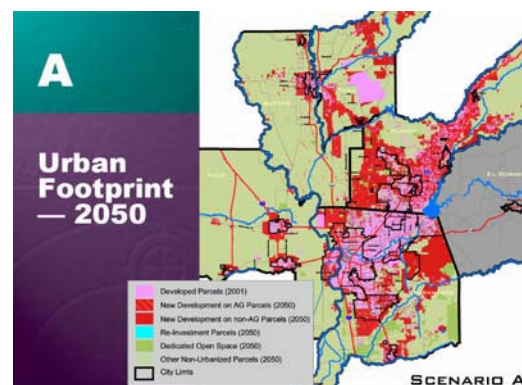
The nature of the scenarios

The Blueprint project produced scenarios at three different levels. The first scenario-building exercise was at the neighborhood level, where citizen participants were shown a base case of the selected neighborhood, then asked to develop a series of “smart growth” alternative scenarios, one per table of participants. These were fed into the PLACE³S modeling program, with the land use and transportation results displayed in real time.

The neighborhood scenarios provided the basis for a series of county-wide scenarios that tested a range of development assumptions. Four scenarios were crafted for each county – a trend scenario plus three alternates that tested a variety of combinations of growth amount, location, mix, housing type, density, and infill/redevelopment.

From these county-wide scenarios, a series of four region-wide scenarios were developed and studied. A fifth, preferred, scenario was developed and adopted at the end of the process.

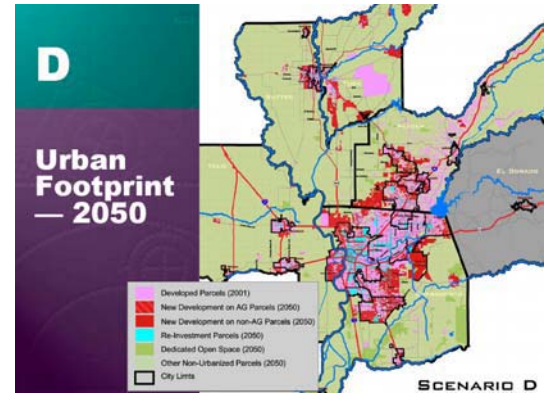
Scenario A: assumes development trends from the late 1990s continued.



Scenario B: assumes higher housing densities than A, but still with significant growth at the urban fringe.

Scenario C: also assumes higher housing densities, but with more growth occurring in the inner ring suburbs.

Scenario D: assumes the highest housing densities among the scenarios, and focused growth in the central parts of the region through infill and redevelopment.



Preferred Blueprint Scenario: assumes compact, mixed-use development, high density housing choices, high levels of infill/redevelopment, and job-housing balance in subareas.

Transportation system improvements for each scenario were crafted to reflect the scenario's land use pattern.

The evaluation process

For the neighborhood scenarios, the indices used were total population and employment, jobs/housing balance, pedestrian friendliness (on a 5 pt. scale), and percent change in VMT/household from the base case.

For the county-wide and region-wide scenarios, the indices used were VMT/household and mode split; square miles of urbanized land, converted farmland, and land needed for development 2050-2070; residential water use; transportation capital and annual operating costs; and per person emissions of criteria pollutants and CO₂.

Evaluation results

Scenarios	Single- : Multi-Family Housing	% Auto	% Transit	% Walk/Bike	% Housing Growth Through Infill
A	75 :25	91.0	1.6	7.3	27.0%
B	67 : 33	83.2	4.0	12.7	39.0%
C	65 : 35	81.8	4.8	13.4	383.0%
D	64 : 36	79.9	4.8	15.3	44.0%
Preferred Blueprint Scenario	65 :35	83.9	3.3	12.9	41.0%

In general, the more urbanized parts of the region showed the widest variation in VMT/household, mode split, transportation operating costs, and air quality, while the more rural parts showed the widest variation in land consumed by development.

Elected official participation/public involvement

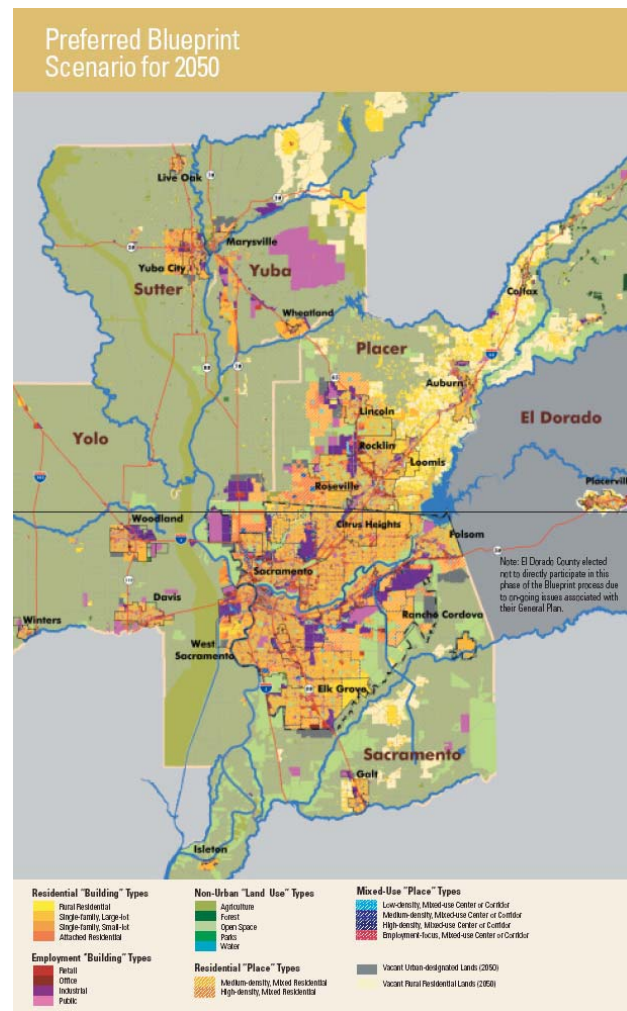
At the neighborhood workshops, the PLACE³S modeling system allowed participants to view the results immediately. The results of the county-wide scenarios analysis were presented at county-wide citizen workshops where participants were asked to make adjustments to the scenarios and to indicate their preference among the four scenarios presented. A similar process occurred with the crafting of the region-wide scenarios. The scenarios, and the analyses of their impacts, provided the basis for a sweeping public involvement campaign, resulting in the adoption of the Preferred Blueprint Scenario in December 2004.

Resulting actions

SACOG will now work to incorporate promote the principles derived from the Preferred scenario among regional local governments, and will explore using the scenario as the basis for the land use allocation in the next update of the region's long-range transportation plan.

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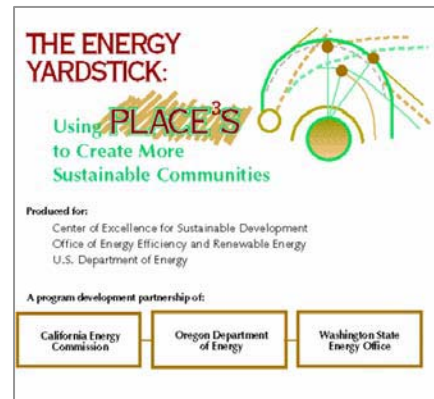
California

San Diego Growth Alternatives Study

Sponsor: San Diego Association of Governments;
California Energy Commission

Completion Date : 1995 **Planning Horizon:** 2010

Source: The Energy Yardstick: Using PACES to
Create more Sustainable Communities
<http://www.energy.ca.gov/places/PLACESGB.PDF>



As an early application of the PLACE³S software, the study was primarily a test of the program's strengths/weaknesses.

The nature of the scenarios

Three scenarios were used:

Business as Usual: a projection forward of recent trends

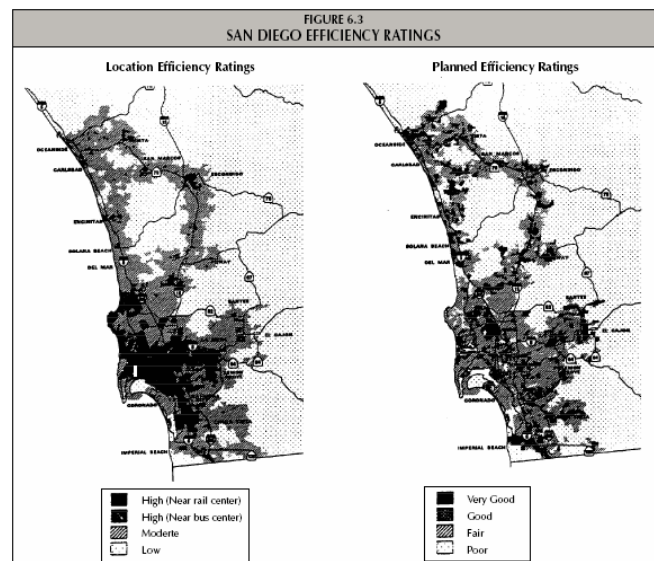
Quality of Life: focusing growth in transit-served areas

Advanced: even greater focus in transit station areas

The same transportation network was used for all three scenarios.

The evaluation process

Though the PLACE³S software can generate a number of different land use and transportation measures, only density, energy consumption, and energy costs were reported.



Evaluation results

SAN DIEGO GROWTH ALTERNATIVES COMPARISON SUMMARY			
LAND-USE DENSITY COMPARISON (Transit Focus Areas) 2010			
	<i>Existing Policies</i>	<i>Quality of Life</i>	<i>Advanced</i>
Dwelling units per acre	20	21	30
Employees per acre	26	29	37
ENERGY COMPARISON (Trillion Btu) 2010			
	<i>Existing Policies</i>	<i>Quality of Life</i>	<i>Advanced</i>
Housing & employment	139.6	139.6	137.6
Transportation	128.2	124.6	114.7
Total	267.8	264.2	252.3

Elected official participation/public involvement

Aside from presentations to the regional energy committee, there is no indication that the results were presented to the public. The elected official participation in the project seems to have been limited to the regional energy committee.

Resulting actions

This application/test of the PLACE³S software led to a series of neighborhood applications, where citizen participation and scenario analysis was substantially more robust.

SANDAG adopted a modified version of the Quality of Life scenario as regional land use policy in 1995. It is unclear to what extent the PLACE³S study influenced the decision.

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California

REGION 2020

Sponsor: San Diego Association of Governments

Completion Date: 1998 **Planning Horizon:** 2020

Source: 2020 Cities/County Forecast Land use Alternatives

The primary motivator for this analysis was the assessment that supplies of buildable land were not sufficient to accommodate forecasted growth under trend conditions. The 1993 SANDAG Regional Growth Management Strategy included a Land Use Distribution Element calling on the region's local governments to place high densities in transit station areas and to promote land use mixing. The analysis in this Forecast was intended to craft several alternative methods to implement those policies and assess their impacts.

The nature of the scenarios

The analysis studied four scenarios:

Existing Policies	Current general and community plans and development policies with development following recent density trends. Average residential density of new development: 3.7 dua.
Land Use Distribution Element (LUDE)	This scenario was intended to demonstrate the maximum implementation of the LUDE element from the Regional Growth Management Strategy; each jurisdiction's highest residential densities and mixed uses were located w/i 1000 ft. of existing and planning LRT stations and town centers; in other areas development was assumed to follow current plans and recent trends. Average residential density of new development: 4.3 dua.
Land Use Distribution Element Plus	Same as LUDE, plus residential development outside station areas was set at the highest allowed densities under current plans. Average residential density of new development: 4.8 dua.
Targets	Same as LUDE Plus, except that it capped residential development in unincorporated areas. Average residential density of new development: 4.9 dua.

The evaluation process

The indices used to compare the scenarios included several measures of land consumption, transportation system performance, and composite air pollutant emissions. The scenarios were specified by the region's planning directors and were tested using the normal SANDAG forecasting, transportation, and air quality models.

Evaluation results

The analysis included several measures of land consumption, including overall acreage consumed and percentage of vacant buildable land consumed by new development

	<u>Acres consumed by new development</u>	<u>Percentage of vacant buildable land consumed by development</u>
Existing Policies	624,200	98%
LUDE	342,700	54%
LUDE Plus	219,300	34%
Targets	200,800	32%

The transportation and air quality outputs were displayed as percentage reductions from the values established for the Existing Policies scenario:

<u>Transportation Category</u>	<u>L.U.D.E.</u>	<u>L.U.D.E. Plus</u>	<u>Targets</u>
Miles of Congestion on Arterials	-71%	-71%	-69%
Miles of Congestion on Freeways	-14%	-17%	-18%
Vehicle Miles Traveled	-13%	-14%	-13%
Vehicle Hours Traveled	-21%	-22%	-22%
Average Trip Length in Time	-20%	-22%	-20%
Average Trip Length in Distance	-13%	-14%	-12%
Total Costs of Travel and Fuel	-19%	-20%	-19%
Total Air Pollutants	-11%	-11%	-11%

Resulting actions

How SANDAG used the outcome of this analysis is unclear.

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California

Euclid PLACE³S Revitalization Program

Sponsor: San Diego Association of Governments;
California Energy Commission

Completion Date: 1995 **Planning Horizon:** 2015

Source: The Euclid PLACE³S Revitalization Program

The primary motivation for the Euclid plan was the need to demonstrate a pilot implementation process for the San Diego Regional Energy Plan at a neighborhood level. Euclid was chosen for its transit access, redevelopment potential, and history of active citizen participation.

The nature of the scenarios

The study analyzed three scenarios: (1) a “business-as-usual” scenario, projecting forward recent trends and maintaining current zoning; (2) an “advanced” or “PLACE³S” scenario prepared by project consultants/sponsors that increased land use densities and heterogeneity; and (3) a “community preferred” scenario, developed by stakeholders in reaction to the PLACE³S scenario, which provided a compromise on density and mixing.

The same transportation network was assumed across all alternatives.

The evaluation process

Given the energy focus of the study, all the indices had an energy hook to them: auto use, CO emissions/resident, Btu/resident, CO₂ emissions/resident.

The focus of the study was the trial use of the PLACE³S planning method. The process used the INDEX GIS modeling software to help develop the scenarios and to assess their relative impacts. It also used a vision/values matrix developed by the citizens and stakeholders involved in the project.

Evaluation results

	<u>% auto trips</u>	<u>CO/person/Yr</u>	<u>MMBtu/per/yr</u>	<u>CO2/per/yr</u>
Business as usual:	70%	87	32.8	12,590
PLACE ³ S:	67%	74	28.4	10,901
Community Preferred:	68%	81	29.0	11,976

The sponsors set out to produce a redevelopment plan that would promote energy efficiency and meet neighborhood livability objectives; they were substantially successful.

Elected official participation/public involvement

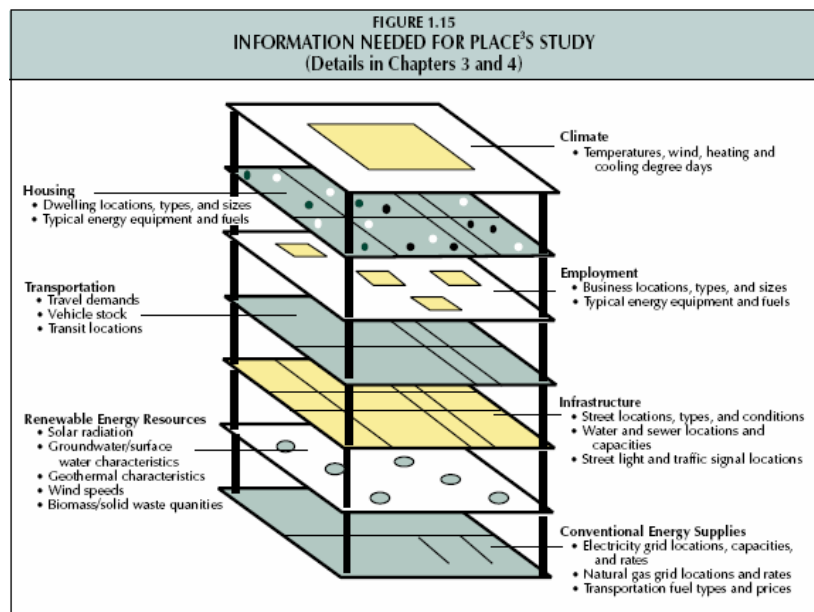
The PLACE³S process was fueled by a significant citizen/stakeholder participation component. Citizens/stakeholders designed the Community Preferred scenario through an interactive charrette process, and seemed to be in control of primary design/plan decisions.

Resulting actions

At last reporting, the resulting plan for the Euclid area was scheduled for adoption by the San Diego city council.

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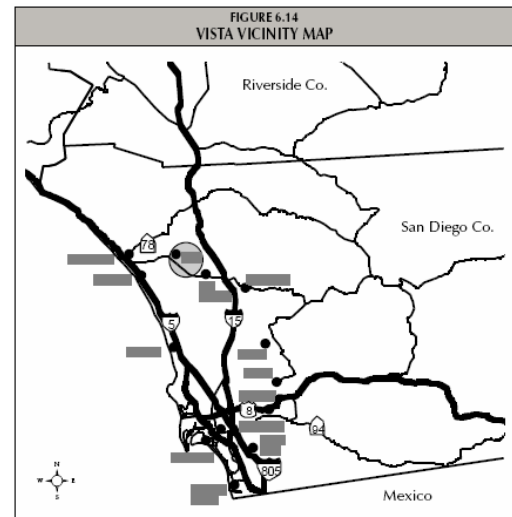
California

Vista Transit Focus Area Study

Sponsor: San Diego Association of Governments;
California Energy Commission

Completion Date: 1996

Source: The Energy Yardstick: Using PLACE³S to Create more Sustainable Communities



The study was part of a regional energy plan, a component in the voter-mandated Regional Growth Management Strategy. A primary purpose of the study was to test the PLACE³S software in a sub-regional, neighborhood setting.

The nature of the scenarios

Three scenarios were used:

Existing Conditions: Development will occur along typical patterns as they exist in the surrounding areas, guided by exiting zoning and market forces

Quality of Life: Development will occur according to a regional vision in the Regional Growth Management Strategy.

Advanced: Development will occur in a manner to attain high levels of energy efficiency within the limits of existing development styles.

For the Advanced Scenario, the study team increased the density of the local street network, reduced the right of ways on major streets, and assumed lower parking ratios.

The evaluation process

The study team used a wide variety of land use indices, from the more standard measures of density and acres per land use, to more unusual measures, such as block size. The transportation indices focused on transit accessibility (e.g., dwellings w/i ½ mile of a rail stop), pedestrian infrastructure capacity, and street design. But these were measures that were

largely specified as model inputs. The model outputs were focused on energy consumption and greenhouse gas emissions.

Evaluation results

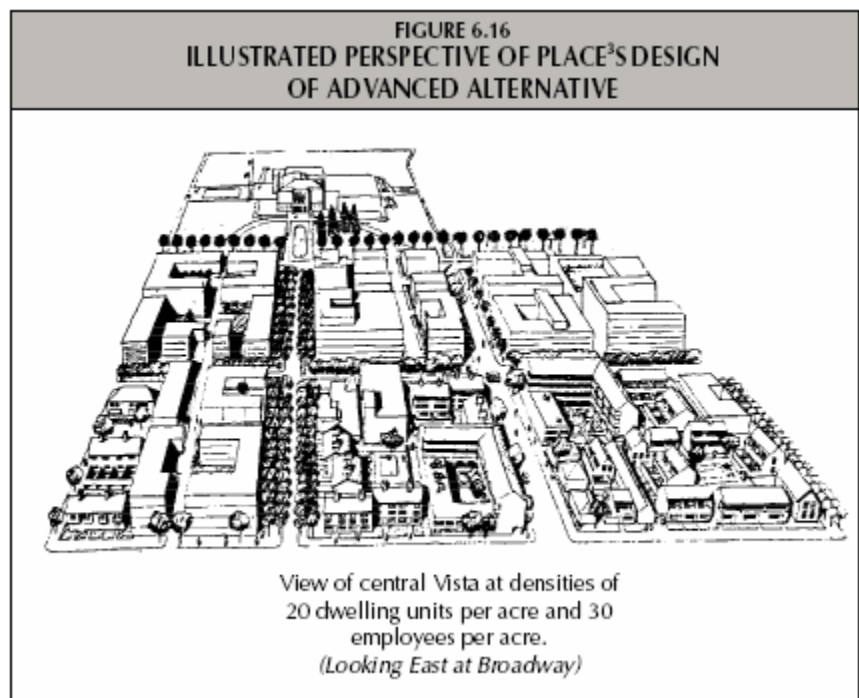
VISTA ENERGY EFFICIENCY RESULTS			
	Base	Quality of Life	Advanced
Energy use (MMBtu/yr)	379,976	390,751	437,513
CO emissions (tons/yr)	322	322	277
CO2 emissions (tons/yr)	34,727	36,229	43,552
Energy use per resident (MMBtu/yr)	531	546	157
Energy use per acre (MMBtu/yr)	3,040	3,126	3,500
CO emissions per resident (tons/yr)	0.450	0.450	0.100
CO2 emissions per resident (tons/yr)	49	51	16

Resulting actions

The study was not intended to result in implementation actions.

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Metro Vision 2020

Sponsor: Denver Regional Council of Governments (DRCOG)

Completion Date: 1995 **Planning Horizon:** 2020

Source: Metro Vision 2020 Urban Form Alternative and Evaluation Criteria

The Metro Vision 2020 process began with a statement of vision and principles aimed at better accommodating the 900,000 new residents expected by 2020 through the development of an integrated long-range regional development and transportation plan.

The nature of the scenarios

The project used four archetypal scenarios to assess the impacts of thematically different development patterns:

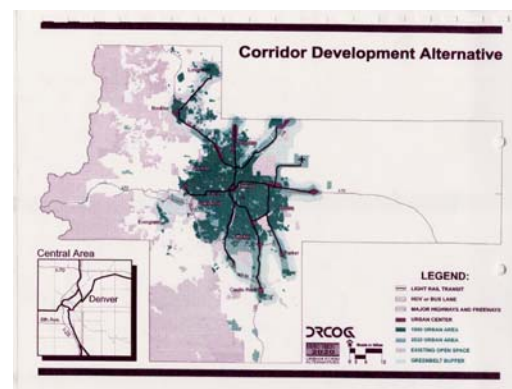
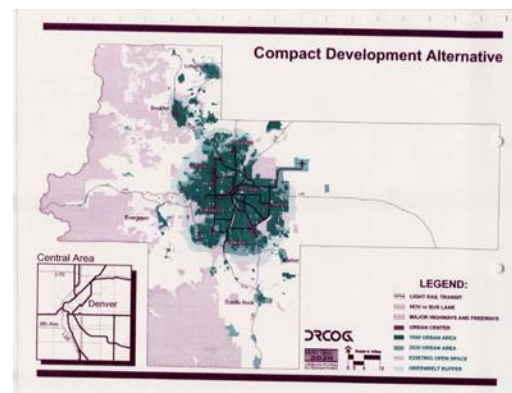
Current Trends: the expected land use pattern that would result from implementing current development policy and existing market conditions.

Compact Development: most growth would locate on infill development sites within the central city and existing suburbs.

Satellite Cities: growth would be channeled to existing satellite communities or new planned communities, physically separated from the central urban area by open space or undeveloped land.

Corridor Development : growth would be located along major transportation routes, especially transit lines.

After these four scenarios were analyzed, a compromise Metro Vision option was crafted and adopted. This “scenario” was not presented as a



detailed potential allocation of households and jobs—as the other scenarios were—but as a statement of six primary principles. The only geographically specific element in the plan was the regional urban growth boundary (which was set at 747 square miles). Subsequently, an open spaces plan was prepared that gave a general geographic focus to the Metro Vision open spaces element.

Transportation investments were altered to reflect the land use patterns of each scenario.

The evaluation process

The scenarios were analyzed according to 25 criteria, classified into five major categories: land use, transportation, environment, open space, and implementation. These measures were derived from the statement of policies and principles made by the sponsor in an earlier phase of the project.

The project initially analyzed 11 urban form scenarios using qualitative evaluation criteria. Based on this analysis, four scenarios were crafted for more in-depth analysis. The analysis used GIS for many of the land use assessments and the regional transportation modeling system to assess transportation and air quality impacts. In addition, a number of other ad hoc measurement tools were used.

Of particular interest was the project's measurement of the implementability of each scenario, as influenced by the degree of acceptance by local officials. To do this, the staff measured the degree to which each scenario was consistent with a regional composite of the existing local plans, and asked local government planners to select the scenario they estimated was closest to local plans.

Evaluation results

Scenarios	Daily VMT	% of Congested VMT	Wildlife Habitat Consumed (sq. mi.)	Annual Additional Water Needed (ac-ft/yr)
Dispersed (Current Trends)	73,900,000	41%	181.8	127,010
Compact Development	64,700,000	59%	71.8	110,789
Satellite Cities	66,600,000	54%	97.4	94,728
Corridor Development	68,600,000	55%	109.7	117,806

The analysis showed the Dispersed Scenario to be the most automobile oriented, land consumptive, and air polluting of the four scenarios. It also, however, had the lowest levels of

traffic congestion and was deemed the easiest to implement. The Compact scenario was the best at promoting alternative mode use and was the most land efficient, but it had the highest level of traffic congestion and the lowest ranking for providing housing close to jobs. According to the region's 2002 long-range transportation plan, three broad themes were evident from the analysis:

- “• The Dispersed Alternative was undesirable for a number of reasons, including cost, land consumption, increased VMT and environmental impacts.
- “• The Compact Alternative was judged to have the lowest cost and minimized the environmental impacts of future growth, but could encounter public resistance to strategies that increased density and mixed-use development to the extent assumed in this alternative.
- “• Any strategy to reduce VMT, increase transit use and improve air quality needs to be a combination of land use, transportation and other measures.”

Elected official participation/public involvement

After the initial eleven alternatives were developed, a public opinion survey, open house meetings, and 2 workshop events were held in which "several hundred citizens and government, business, and environmental leaders" (p.vii) were involved. The Vision 2020 Task Force then selected the 4 scenarios.

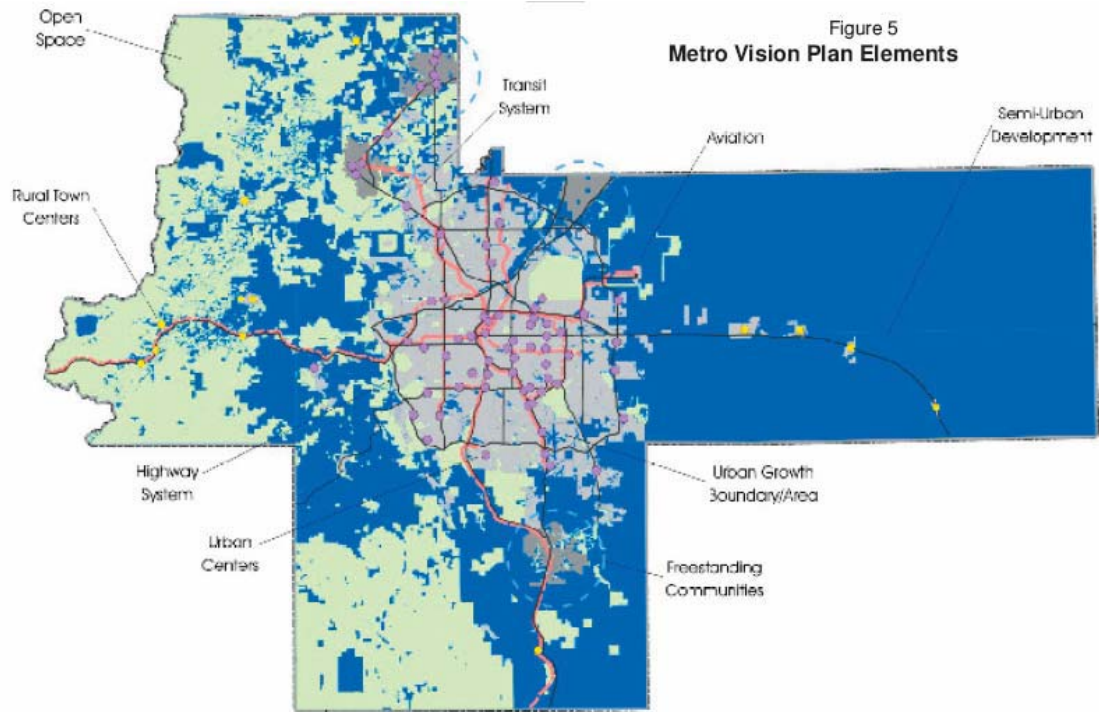
DRCOG adopted the Metro Vision Framework in 1997. Given the agency's council of government structure, local elected official participation is assumed.

Resulting actions

The Metro Vision process led to the development of a regional open spaces plan and the creation of the Mile High Compact, through which a majority of the local governments in the region committed to adopt policies and amendments to planning and zoning documents consistent with the Metro Vision Framework.

Projects included in the 2002 long-range transportation plan were designed to be consistent with the Metro Vision Framework. However, the land use forecast for the region does not appear to have been affected by Metro Vision.

DRCOG is presently working to update Metro Vision, and, among other things, extend its range to 2030. In the meantime, the city of Denver has taken the lead in implementing Metro Vision by adopting its Blueprint Denver integrated land use and transportation plan. Through this plan, the city has brought geographic specificity to the policy elements of Metro Vision, and has established a list of specific implementing actions designed to make Metro Vision a reality.

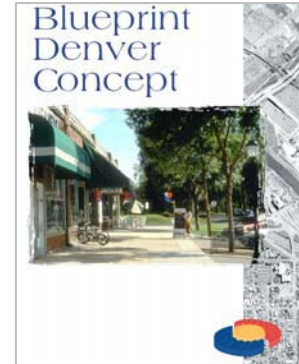


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Blueprint Denver

Sponsor:	City & County of Denver		
Completion Date:	2002	Planning Horizon:	2020
Source:	Blueprint Denver: An Integrated Land Use and Transportation Plan http://www.denvergov.org/Blueprint_Denver/Blueprint/Blueprint%20Denver/start_TOC.pdf		



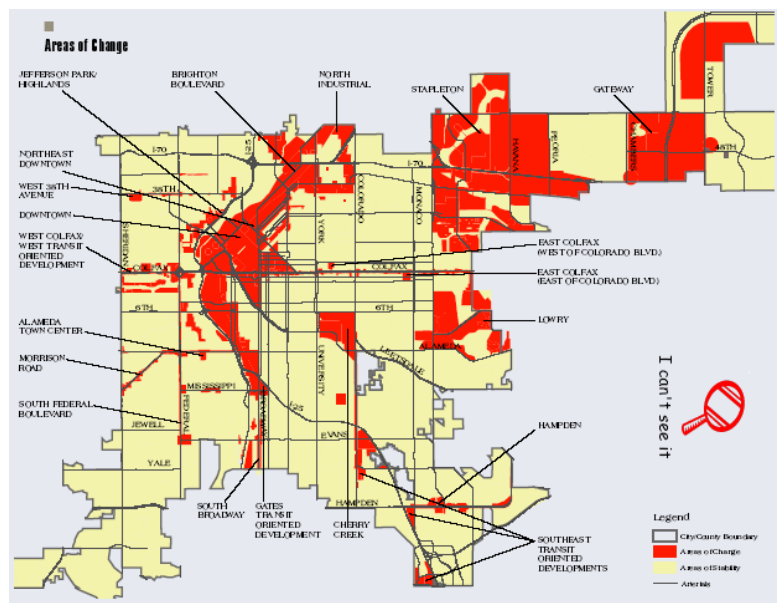
Blueprint Denver is an intermediate step in the implementation of policy changes indicated by the Denver Regional Council of Government's Metro Vision 2020 project. After the completion of the Metro Vision study, Denver adopted an update of its comprehensive plan, called Plan 2000, which reflected policy directions from Metro Vision. The Blueprint plan identifies specific regulatory and policy changes necessary to implement decisions made in the earlier documents.

The nature of the scenarios

The project contains two scenarios, both based on the twin notions of "areas of change" and "areas of stability":

Zoning Capacity: allocates future growth on vacant land (much of it infill) and through redevelopment according to available zoning capacity (above what's already there) and the output of a real estate development model.

Blueprint: focuses much of the future growth into the "areas of change" – large scale development areas (e.g., Stapleton), transit corridors and station areas, and downtown.



The evaluation process

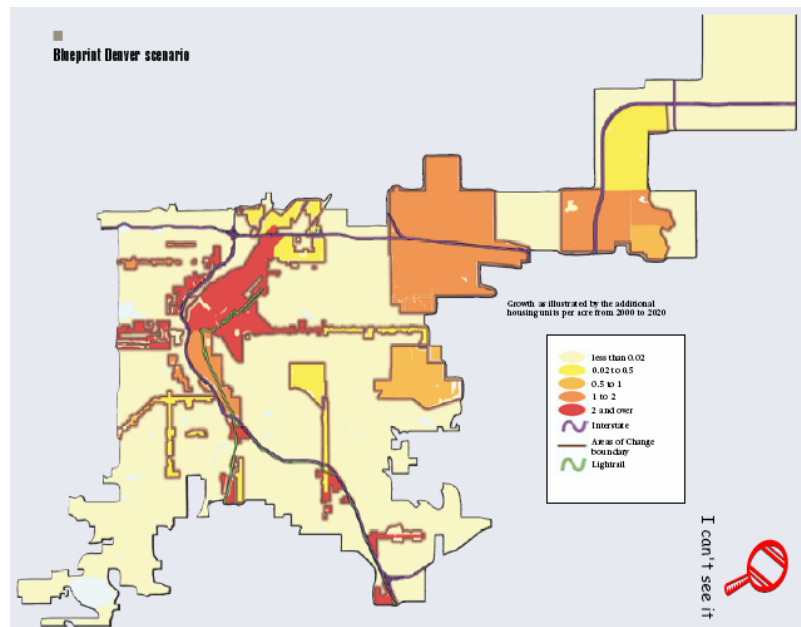
Although there is mention of comparative levels of transit ridership and traffic congestion, no analysis of those measures is presented. What is presented is a comparison of the percentages of household and employment growth going to the areas of change and stability under each scenario.

The region's real estate development model was used to determine the likely development pattern under the zoning capacity scenario. Redevelopment capacity was determined by calculating whether a development project within the limits of existing zoning would be profitable, accounting for the expenses of acquisition, demolition, and construction.

Evaluation results

The Zoning Capacity scenario would result in household growth levels that are higher in "areas of stability" (34%), and lower in the transit-supported areas (13%) and downtown (24%) than the Blueprint scenario, which had levels of 13%, 25%, and 35%, respectively.

Similarly, the Zoning Capacity scenario would place more jobs in the areas of stability (37%), and fewer in the transit-supportive areas (25%) and downtown (24%) than the Blueprint scenario, which would allocate jobs 14%, 27%, and 43%, respectively.



Elected official participation/public involvement

Many of the decisions in the Blueprint project were made by a 46-member advisory committee. The committee began by identifying areas where growth would be beneficial, and areas that should be protected against significant growth. The result was a map of "areas of change" and "areas of stability." This map was presented to the public through a series of open houses for comment and alteration. Workshops in each of the area types followed to identify measures appropriate to each. Although a series of scenarios was anticipated using these concepts, one consensus scenario emerged.

Resulting actions

As mentioned above, the Blueprint plan is an implementation tool intended to identify specific strategies for engaging the principles contained in DRCOG's Metro Vision 2020 and the city's Plan 2000. The second half of the plan outlines detailed actions that would amend the city's zoning code, subdivision code, and transportation plans.

As the subtitle for the plan indicates, Blueprint is an integrated land use and transportation plan. As such, it represents a significant integration of those subjects, and presents a road map for integrated decision making in the future.

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District of Columbia

A Network of Livable Communities

Sponsor: Chesapeake Bay Foundation & Environmental Defense Fund

Completion Date: 1996 **Planning Horizon:** 2010/2020

Source: "A Network of Livable Communities: Evaluating Travel Behavior Effect of Alternative Transportation and Community Designs for the National Capital Region"
http://www.environmentaldefense.org/documents/746_networkof.PDF

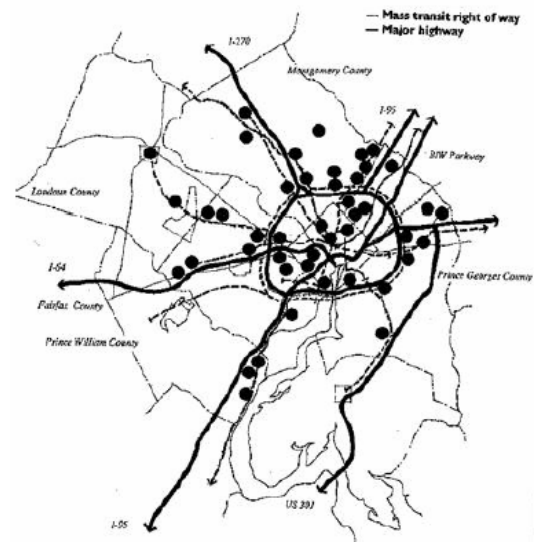
The study was undertaken by two nonprofit advocacy organizations to demonstrate the effectiveness of land use policies to reduce reliance on automobile transportation.

The nature of the scenarios

The study analyzed two scenarios:

COG scenario: the officially adopted land use forecast and regional transportation plan.

CBF/EDF scenario: focuses future household/job growth in 40 pedestrian/bicycle/transit-friendly centers; growth occurring outside these centers would be contained by a growth boundary; the centers would be connected by a new light rail system, in addition to existing transit services, and road improvements would focus on maintenance of the existing system; demand management policies including a \$1-\$7/day parking charge would be imposed.



The evaluation process

The indices used in the analysis were the traditional measures of transportation system performance: VMT and VT (total and per household) and mode split.

The study sponsors based their analysis on the region's official transportation forecasting model, supplemented with a "Proximity Mode Choice Model," — a spreadsheet-based model designed to incorporate travel variations correlated with pedestrian/bicycle/transit-friendly design.

Evaluation results

Scenarios	VMT per Household	Vehicle Trips per Household	% Work Auto Trips	% Work Walk Trips
Council of Governments	85.0	9.80	69%	4%
CBF/EDF	75.0	7.38	46%	16%

The study demonstrated significantly lower levels of auto use under the CBF/EDF scenario. In many cases, the comparisons were for different years: the COG scenario statistics were for 2020 while the CBF/EDF stats were for 2010.

Elected official participation/public involvement

As a study intended to influence/challenge the status quo scenario, it is not surprising that there was little evidence of elected official participation in the study process. The report does note, however, that a series of small group meetings with citizens in the region helped to identify the 40 areas for the growth centers.

Resulting actions

The report ends with a series of recommendations for further analysis by the MPO (MWCOG), including changes in modeling procedures and assessment of alternative scenarios. There is no indication of the degree to which MWCOG incorporated these recommendations.

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Transportation Demand Impacts of Alternative Land Use Scenarios

Sponsor: Metropolitan Washington Council of Governments/FHWA

Completion Date: 1993 **Planning Horizon:** 2010

Source: G.V. Wickstrom and R.J. Milone.
"Transportation Demand Impacts of Alternative Land Use Scenarios" from the 4th Conference on Transportation Planning Methods Application. Washington, DC: TRB (1993).



FHWA contracted this project as a case study of a larger effort to “examine the impact urban area development alternatives on the efficiency and transportation system performance.” Other areas studied included Denver, Dallas, Baltimore, and Philadelphia.

The nature of the scenarios

Two alternatives were compared to the baseline/trend scenario. Both alternatives were deemed to be “compatible with current regional development policies.”

Trend: Assumptions about a jobs/housing imbalance (i.e., more than 1.5 jobs/household) led to a conclusion that there would be an 84% increase in daily trips between 1995 and 2010 from ~200,000 households that would locate in counties outside the COG area.

Balanced: The objective was to create a jobs/housing balance by shifting the 200,000 external households into job-rich locations in the COG area.

Concentrated: This alternative assumed the household shift in the Balanced scenario, and then doubled the expected job growth in areas with current high transit trip destination rates. These jobs were taken from other areas with lower transit usage.

All alternatives used the highway and transit networks from the adopted long range transportation plan.

The evaluation process

The study used regional measures of person, transit, and auto work trips; total VT; total VMT; and average peak hour speed; and average household measures of person, transit, and auto work trips; total vehicle trips; and average trip length.

The COG staff used the 4-step model normally used for travel forecasting (MINUTP), foregoing the use of the mode choice modal and instead assuming base case mode splits.

Auto occupancy, vehicle ownership, and parking price components were also held constant at base case levels. Walk, bike, and non-work transit trips were not modeled.

Evaluation results

Scenarios	Daily VMT	Daily Vehicle Trips	Daily Transit Work Trips
Base Case	103,800,000	12,020,000	672,000
Balanced	104,800,000	12,700,000	762,000
Concentrated	105,100,000	12,580,000	802,000

Because the alternative land use scenarios included 200,000 more households than the base case, the region wide numbers are difficult to compare. At the household level, however, variations showed reductions in auto use. At a subregional level, the alternatives showed increases in VMT in the areas receiving additional growth and reductions in areas losing growth.

Resulting actions

The case study was part of a larger FHWA project “Ensuring the Efficiency of Urban Transportation Systems.” Additional research was recommended, including expanding the study boundary to eliminate the household disparity between alternatives, feeding-back the speed reductions and transit service increases to the mode choice model, and testing moving jobs to households. No follow-on activities were apparent. The report notes that “the ability to implement the land use changes tested was not examined.”

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2025 Metropolitan Transportation Plan

Sponsor: Wilmington Area Planning Council

Completion Date: 2000 **Planning Horizon:** 2025

Source: 2025 Metropolitan Transportation Plan
(Feb. 23, 2000)



The scenario analysis in this study was done as part of the regular TEA-21 mandated long-range plan update process.

The nature of the scenarios

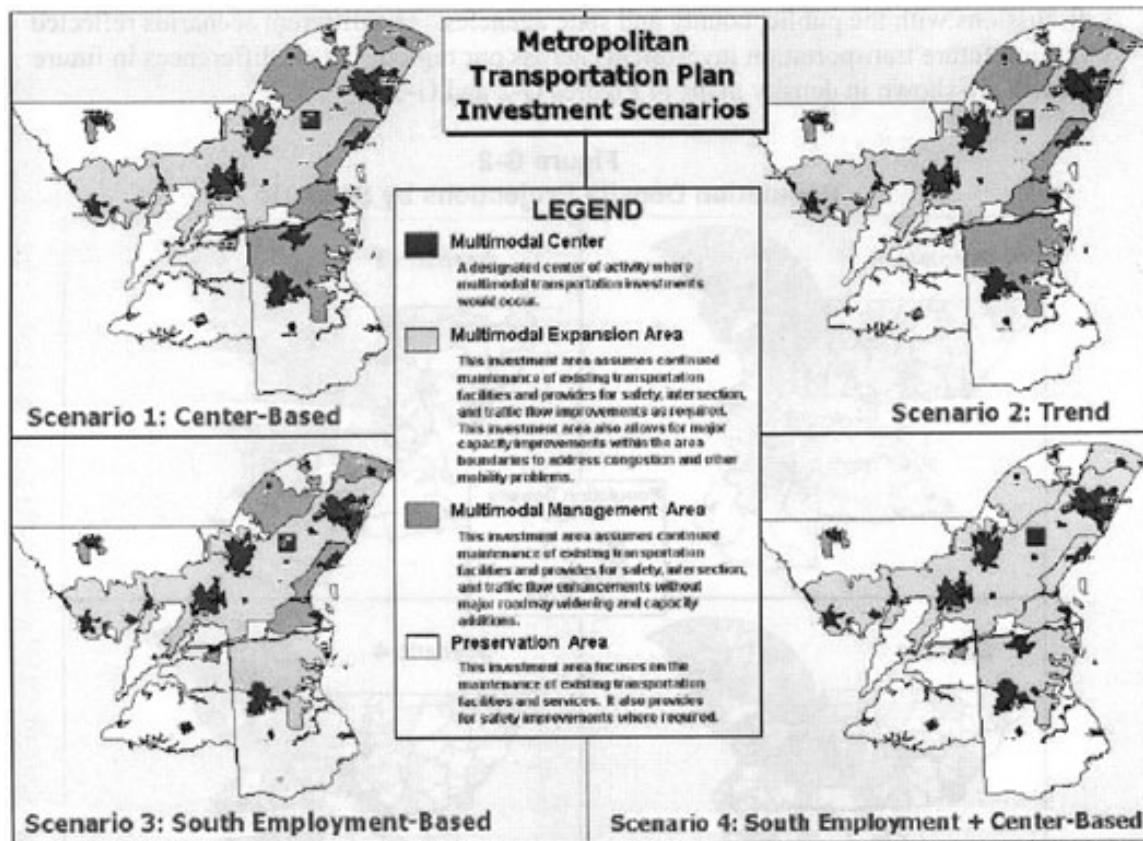
There were five initial scenarios in the project—a no-build base case, plus four build scenarios. The build scenarios were crafted using a three-step process: First, four different transportation investment area maps were designated, each showing a different geographically based level and type of transportation investment and commensurate population and employment growth patterns. Second, population and employment forecasts were crafted to match the transportation area maps in step one. Last, the staff sorted proposed transportation projects—both expansion and maintenance—according to their suitability to the four investment maps/land use forecasts. Using this system, the staff created four scenarios:

Centers-Based: concentrates transportation investments and growth in the existing centers of the region and along the I-95 corridor.

Trend: incorporates the transportation investments contained in the previous long-range plan, plus growth patterns according to recent regional trends.

South Employment-Based: shifts transportation system expansions and growth to the more suburban/exurban southern portions of the region.

South Employment and Center-Based: shifts even more growth and investments to the southern portions of the region, and “most accurately reflect[s] the County’s suburban zoning and proposed sewer service area.” (p. G-3).



2025 Plan: After stakeholder and public input, the agency created and adopted a sixth scenario that blends the population growth pattern of the South Employment-Based scenario and the jobs growth pattern of the South Employment and Center-Based scenario.

The evaluation process

The performance measures used in the study fell into four primary categories: mobility/accessibility, livability, environmental preservation and air quality, and cost and financial “reasonableness.”

In the modeling of the four scenarios, the staff elected to assume a consistent mode split across all alternatives. The reason for this was not entirely clear: “By testing each of the scenarios with no change in mode share, we will be able to more clearly see the effects of the potential changes in growth and investments.” (p. G-9).

For most of the indices measured, the study used letter grades, rather than numeric values, to establish a rank order among the scenarios. Hence, the assessment was primarily driven by a qualitative conclusion about how well each of the scenarios met the identified goals for the region.

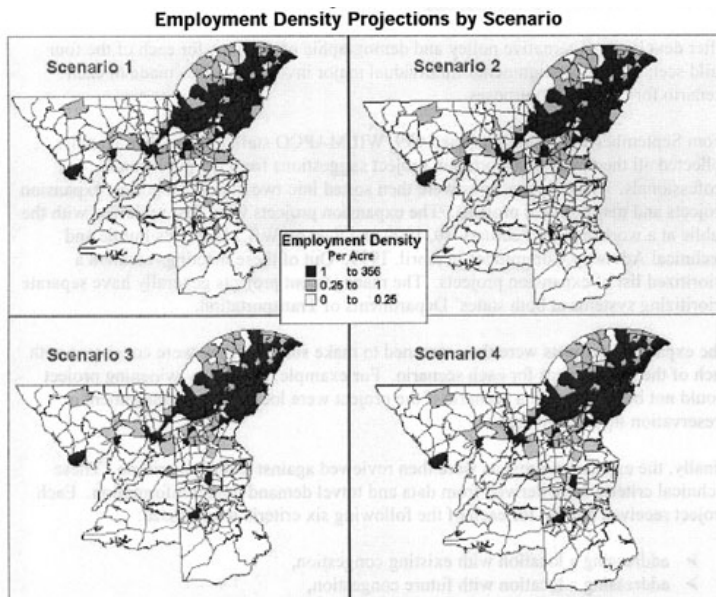
Evaluation results

The analysis showed the Centers-Based scenario to have the lowest levels of auto usage, and the slowest average peak hour speed, of all the build scenarios. In contrast, the 2025 Plan scenario, the one adopted by the agency, has the most auto usage and the highest peak hour speeds.

Scenarios	Daily VMT	Av. Trip Length	Peak Hour Speed	NOx Tons/Day	HC Tons/Day
No Build	24,740,000	8.92	32.5	33.40	18.21
Center Based (#1)	24,760,000	9.02	33.6	33.99	18.18
Trend (#2)	24,820,000	8.93	33.8	34.18	18.09
South Employment - Based (#3)	24,940,000	9.08	34.1	34.36	18.04
South Employment + Center - Based (#4)	25,000,000	9.13	34.2	33.40	18.11
2025 Plan	25,200,000	9.05	34.08	33.40	18.42

Elected official participation/public involvement

The four initial build scenarios were crafted by several advisory committees to the sponsor agency. There does not appear to have been any particular effort to garner or incorporate citizen or elected official input outside of those committees. The selection of the final, adopted scenario appears to have been based in part of input from citizens and officials (as one would expect), but it is not clear how that input was solicited or what its content may have been.



Resulting actions

The study was driven by the need for a new long-range transportation plan. Hence, the process was designed, by necessity, to result in a decision that would then be implemented, at least on the transportation side, through regular transportation improvement programs. How implementation measures on the land use side might be adopted was less clear.

As to land use-transportation integration, the process used to build the initial scenarios demonstrated a basic understanding of those relationships. By starting the scenario building process with the classification of geographic areas according to levels and types of transportation investments and concomitant levels of future household and employment growth, the analysis began with the assumption that land use and transportation are integrated.

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Regional Transportation Plan 2025

Sponsor: Wilmington Area Planning Council

Completion Date: 2003 **Planning Horizon:** 2025

Source: Regional Transportation Plan 2025: Opening the Door to Change
<http://www.wilmapco.org/RTP/RTP.pdf>

This update to the 2000 Metropolitan Transportation Plan focuses almost exclusively on transit system and service issues. The implied assumption is that the highway portions of the 2000 version are adequate for the time being, but that the transit sections need significant revision. It appears that this need comes, at in part, from the updates to service/capital plans recently completed by the two transit operators in the region.

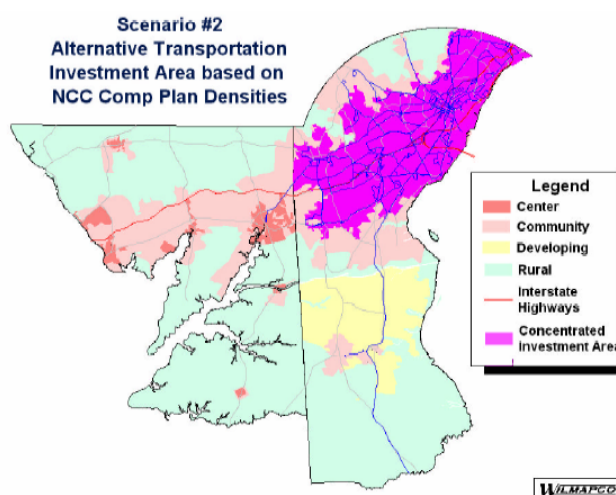
The nature of the scenarios

The four scenarios tested for this plan update vary on three primary elements: future transit system elements, projected population and employment patterns, and future transit fare assumptions.

Scenario 1 – Current Plan: includes projects and policies in the current WILMAPCO Metropolitan Transportation Plan and current growth projections.

Scenario 2 – Updated Agency Plans: relies on the updated transit agency plans for the transit portion of the transportation system, the current WILMAPCO plan for other transportation elements, and current growth projections.

Scenario 3 – Transit Expansion with Transit-Oriented Development: significantly expands the transit system assumed in scenario 2 and assumes transit-supportive land uses in the more urbanized portion of the region, consistent with existing zoning.



Scenario 4 – New Castle County Redevelopment Scenario: includes the transit network in Scenario 2, plus one of the system expansions in Scenario 3, and a theoretical redevelopment pattern for the most urbanized portion of the region.

Adopted Plan: includes significant expansions to the transit network, but maintains trend assumptions about growth allocations.

There is some variation in transit fare assumptions between scenarios.

The evaluation process

The scenario analysis used the EPA Smart Growth INDEX model to measure the traditional indices of VMT, mode split, VHT, VHD, and capital and operation costs.

Evaluation results

Although the transit system elements varied significantly between scenarios, the land use allocations did not: the scenario with the greatest land use changes increased the number of transit-served households by only 3 percentage points, and the number of transit-served jobs by only .25% percentage points, over the trend. Hence, while the analysis showed progressively decreasing auto usage from Scenario 1 through Scenario 4, the differences were not great. Transit ridership in Scenario 4 did increase more than 50% compared to Scenario 1, but this represents only a shift from 1.68% to 2.63% of all trips.

Scenarios	Daily VMT	% SOV Trips	% Carpool Trips	% Transit Trips	% Walk/Bike Trips	CO2 Tons/Day
Current WILMAPCO Metro Plan	29,120,000	71.99%	22.94%	1.68%	3.39%	15,721
Updated Agency Plans	28,840,000	71.51%	22.80%	2.31%	3.38%	15,574
Transit Expansion with Transit Oriented	28,710,000	71.26%	22.73%	2.63%	3.37%	15,527
New Castle County Redevelopment	28,280,000	71.34%	22.75%	2.63%	3.37%	15,309

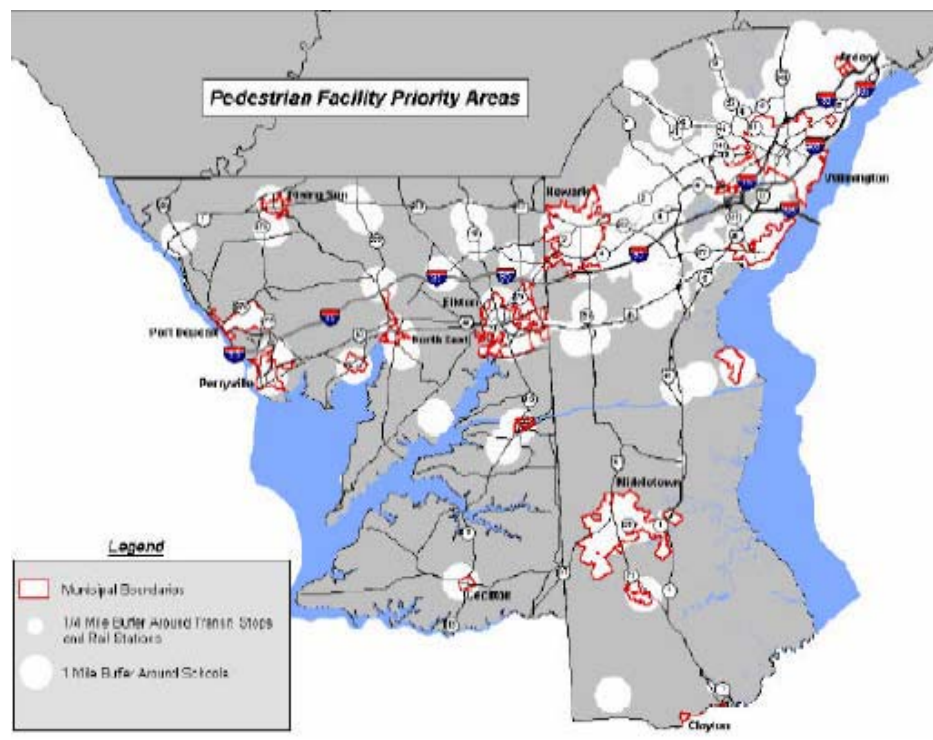
Elected official participation/public involvement

Elected officials and the public were involved in commenting on a draft of the final plan. However, there is no indication that either group significantly participated in other parts of the study process.

Resulting actions

What's significant about WILAMPCO's long-range transportation planning process (both in this update and in the previous "2025 Metropolitan Transportation Plan" (2000)) is its willingness to incorporate alternative land use assumptions as part of its planning process, even in the absence of local government buy-in. While the lack of buy-in means that the agency cannot incorporate the alternative strategies in its final, adopted alternative, it gives the agency the opportunity to educate local leaders on the interactive effects of land use and transportation, and the need address both topics consistently.

Also significant is the agency's use of "transportation investment areas" as a way of prioritizing and focusing transportation investments and emphasizing the need to have land use policy in congruence with infrastructure investments.



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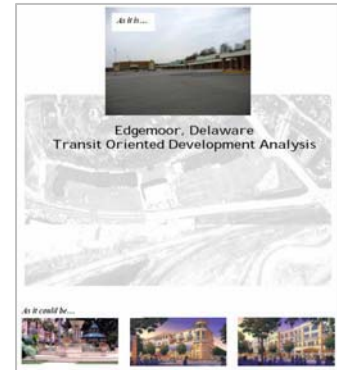
Delaware

Edgemoor, Delaware Transit Oriented Development Analysis

Sponsor: Wilmington Area Planning Council & Fox Point Association

Completion Date: 2003

Source: Edgemoor Transit Oriented Development Analysis (Feb. 2003)
<http://www.wilmapco.org/edgemoor/edgemoor%20TOD%20report.PDF>



The study examines the travel reduction benefits of redeveloping an abandoned shopping center as a transit-oriented development. The project was one 20 pilot projects testing the EPA Smart Growth Index Model.

The nature of the scenarios

Three scenarios were analyzed:

Scenario 1 – Merchant’s Square Redevelopment and Local Transportation: adds 1250 jobs and sidewalk improvements to the site.

Scenario 2 – Enhanced Land Use and Redevelopment: includes Scenario 1, and adds 143 units of multi-family housing.

Scenario 3 – Transit Station Community: includes scenarios 1 and 2, and adds a new station for the regional rail transit network.

The evaluation process

The transportation indices included VMT and VT per capita, transportation costs per household, and a measure of sidewalk completeness. Land use measures included jobs/housing balance and pedestrian route directness to the proposed transit station.

The analysis was part of a pilot project testing the EPA Smart Growth Index Model, a GIS based sketch planning model.



Evaluation results

Given the cumulative nature of the scenarios (each building on the previous), it is not surprising that Scenario 3 performed the best on promoting a better jobs/housing balance and reducing vehicle use.

Key Indicators	Base	Scenario 1	Scenario 2	Scenario 3	Base vs. Scenario 3
Population density (population/sq. mi.)	7056.58	8632.71	8952.26	8952.26	26.9%
Jobs/housed workers ratio	0.08	0.48	0.45	0.45	462.7%
Land-use diversity	0.15	0.65	0.63	0.63	317.4%
Residential density (dwellings/acre)	9.64	9.64	9.66	9.66	0.1%
Multi-family housing share	58.90	58.90	58.52	58.52	-0.6%
Housing proximity to transit (avg. ft.)	581.16	568.35	585.43	568.31	-2.2%
Employment density (employees/acre)	4.74	24.14	24.71	24.71	421.6%
Employment proximity to transit (avg. ft)	549.27	877.72	911.40	334.17	-39.2%
Sidewalk completeness (percent)	22.12	68.65	22.12	68.65	210.3%
Walkability index	2.78	3.37	2.79	3.37	21.0%
Vehicle miles travel (per capital)	30.00	24.31	24.77	24.45	-18.5%
Vehicle trips (per capita)	3.20	2.54	2.57	2.56	-20.0%
Carbon monoxide (CO) (lbs/yr/capita)	617.12	500.32	509.90	503.31	-18.4%
Hydrocarbon (HC) (lbs/yr/capita)	79.74	64.62	65.86	65.01	-18.5%
Oxides of nitrogen (NOX) (lbs/yr/capita)	50.49	43.21	43.80	43.38	-14.1%
Carbon dioxide (CO2) (lbs/yr/capita)	8.58	7.54	7.63	7.57	-11.8%

Resulting actions

Other than a call for more study, there is little indication of resulting actions.

Contact information

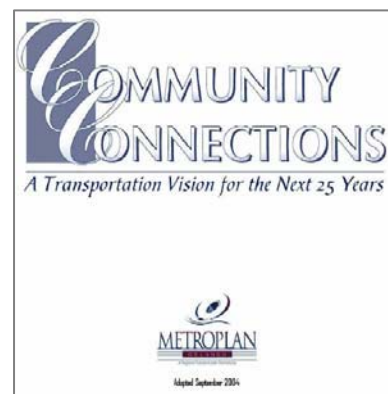
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Community Connections: A Transportation Vision for the Next 25 Years

Sponsor: METROPLAN Orlando

Completion Date: 2004 **Planning Horizon:** 2025

Source: Community Connections: A Transportation Vision for the Next 25 Years—Summary Report/Technical Report No. 5:
http://www.metroplanorlando.com/2025_ltrp/TR_5_Summary%20Report%20Adopted_Sept_04.pdf



As part of an update to the region’s long-range transportation plan, Metroplan developed and analyzed an “experimental” alternative land use strategy.

The nature of the scenarios

The analysis made use of two scenarios:

Adopted 2025 Land Use: assumes continuation of current trends.

Experimental 2025 Land Use Concept: assumes a land use pattern designed to increase internal trip capture, foster multi-modal travel, promote reverse commuting, and utilize community-oriented design. It was not apparent how these objectives were reflected in the scenario.

The evaluation process

The scenarios were tested for their impacts on accessibility, efficiency, transit ridership, and economic and environmental benefit.

The analysis utilized the Florida Standard Urban Transportation Model Structure.



Evaluation results

The Experimental scenario had the fewest impacts on transportation and environmental systems.

Scenarios	Daily VMT	Daily Hours Delay	Riders on North-South LRT
Adopted 2025 Land Use	71,339,516	1,393,146	32,691
Experimental 2025 Land Use Concept	69,625,525	1,273,207	38,972

Elected official participation/public involvement

The Adopted scenario was developed in the usual multi-agency process for establishing regional forecasts and allocations. The Experimental scenario was developed by staff, with assistance from the project consultants.

Resulting actions

The scenario analysis was not intended to result in any immediate policy or institutional changes in the region. The only two resulting recommendations were to seek funding for a reverse commute program and to offer a series of transportation-land use linkage workshops for local governments in the region.

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2020 Transportation Plan: The Livable Community Reinvestment Plan

Sponsor: Metropolitan Transportation Planning Organization for the Gainesville Urbanized Area

Completion Date: Adopted December 2000 **Planning Horizon:** 2020

Source: The Livable Community Reinvestment Plan: Making Transportation Investments that Support Livable Communities and Neighborhoods

This is a regular update of the Gainesville region's long-range transportation plan. In addition to the federal mandate, however, the process appears to be motivated by concerns over expected high growth rates (47% increase in pop.) during the planning horizon, leading to a series of specific challenges outlined in the intro to the plan: "lack of street connectivity, uncomfortable streets for walking and bicycling, suburban sprawl development patterns and unbalanced growth, impacts to existing neighborhoods and changes in town character, preservation of natural resources and habitat, limited travel options, inadequate bus service coverage, traffic congestion/safety on major roadways."

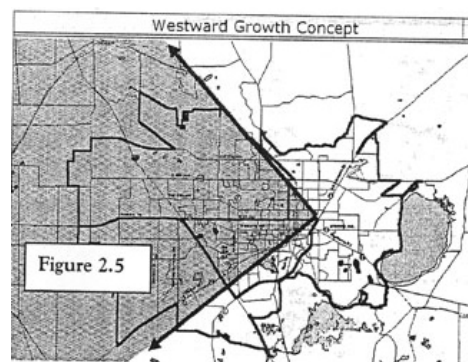
The nature of the scenarios

In introducing the scenarios, the plan acknowledges that the approach is different from past updates: "Unlike typical long range transportation plans, where computer models are used to test alternative transportation capacity improvements against a fixed future land use forecast, this plan involved the testing of four distinct land use alternatives, each with its own set of supporting transportation projects. The purpose was to evaluate alternative urban forms and determine the most desirable way for the metropolitan area to meet its transportation needs into the future." (pp. 4-5)

The process developed and tested seven scenarios:

Base Case: includes only the existing and committed transportation network and the trend land use allocation.

Westward Growth: a trend scenario, assuming continuation of current development trends and expansion of the associated roadway network.



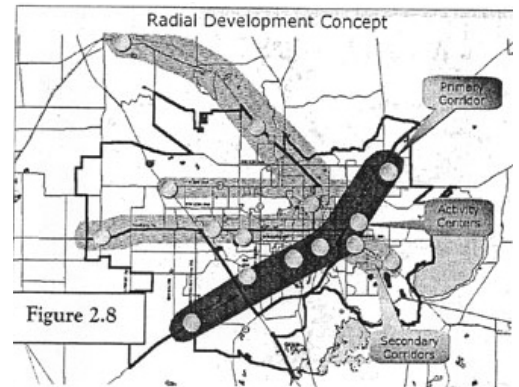
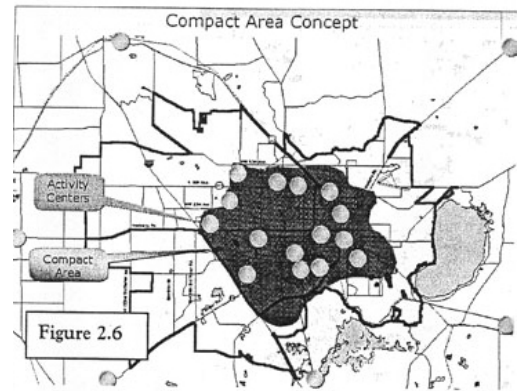
Compact: promotes infill and redevelopment in the urban core “as a way to provide the land use density, diversity (mix) and design to reduce the number and length of automobile trips.” (p. 5)

Village/Town Centers: directs development to multiple centers of moderate density and mixed uses, with transportation improvements emphasizing internal accessibility and multi-modal connections between centers.

Radial Development: promotes higher intensity development along primary corridors of a proposed expanded transit network. Areas between corridors would be preserved for lower density residential development or open space.

Needs Plan: the preferred scenario, the Needs Plan is a hybrid of the Compact, Village/Town Centers, and Radial Development scenarios.

Cost Feasible Plan: the adopted scenario, this scenario ranks the transportation projects included in the Needs Plan scenario, officially incorporating only those that have reasonable assurance of funding during the planning horizon.



The evaluation process

The evaluation measures were “based on the public workshops held early in the study.” The study utilized the agency’s normal GIS and transportation demand modeling systems.

Evaluation results

Scenarios	Single/Multi-Family Housing	Daily VMT	Daily Hours of Delay	% SOV Trips
Westward Growth	94% : 6%	4,410,000	27,422	83%
Compact	64% : 36%	4,280,000	29,569	68%
Village / Town Centers	61% : 39%	4,500,000	32,657	73%
Radial Development	59% : 41%	4,310,000	30,097	68%

The Compact scenario was the least auto-dependent of the four main scenarios tested. A significant influence in that result was a substantial shift to carpooling (25%) over the Westward scenario (15%). While the Village Centers scenario was did not have as low VMT figures as the Compact scenario (4.5 mil. vs. 4.28), it had the highest increase in transit ridership among the four (261.8% increase from current).

Elected official participation/public involvement

A series of workshops were held early in the study process, at which the evaluation measures used for the study were established. After the analysis of the scenarios, the staff held another series of workshops and public forums to present and discuss the results.

The top funding priority in the adopted plan are the projects identified through an intensive community planning charrette held in 1997.

Resulting actions

The plan acknowledges that the agency has direct authority only over transportation decisions, not land use policy. However, it also notes that as the MPO, the agency has institutional and persuasive roles to play in how land use policy for the region is set: “[B]ecause the MTPO consists of all members of the City of Gainesville Commission and the Alachua County Board of County Commissioners and is the only routine occasion for those two boards to sit together as a single body, the MTPO is arguably in the best position to discuss and promote policies relating to the integration of land use and transportation on a broad, regional scale.” (p. 8)

The plan suggests the creation of a Livable Community Reinvestment Plan Implementation Committee “to review and comment on transportation issues and land use plans, amendments or policies relative to their consistency with the MTPO 2020 Plan.” (p. 9)

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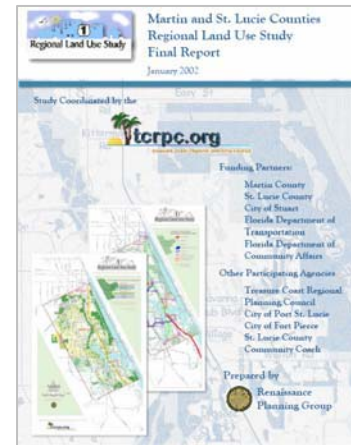
Florida

Martin & St. Lucie Counties Regional Land Use Study

Sponsor: Treasure Coast Regional Planning Council

Completion Date: 2002 **Planning Horizon:** 2025

Source: Martin & St. Lucie Counties Regional Land Use Study,
Phase I Final Report
http://www.tcrpc.org/regional_lu_study.htm



The introduction to the study indicates that the sponsoring agencies hope, through the study, to “provide a more balanced transportation system; reduce the need for major capacity expansions to US 1; encourage new development and redevelopment in targeted areas, and preserve agricultural lands and environmentally sensitive areas.” It appears that the motivating impetus for the study was an analysis by Florida DOT showing the need for substantial, costly, and disruptive improvements to US 1.

The nature of the scenarios

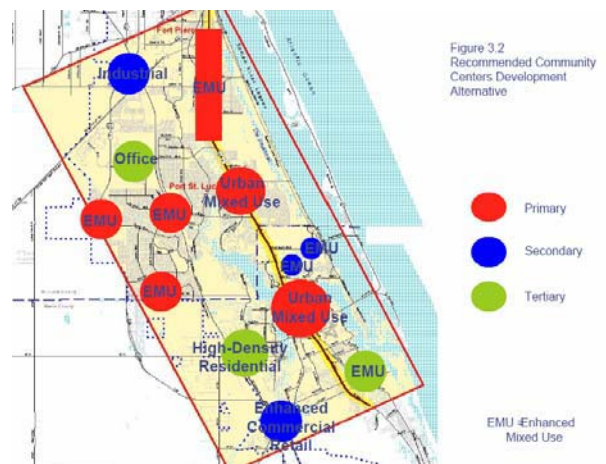
The transportation and land use elements for the four scenarios were developed in an iterative fashion to ensure that the two were mutually supportive:

Base Scenario: includes the existing transportation systems, plus committed additions to those systems, with a trend-based land use growth pattern.

Cost Feasible Scenario: includes the base scenario conditions, plus the system expansions included in the current long-range plan.

US 1 Redevelopment/Infill Scenario: focuses future growth and transportation investments along the US 1 corridor in a series of mixed-use activity centers

Community Centers Scenario: clusters future growth within nodes located at major intersections in the study area



The evaluation process

To create the scenarios, the study team developed a series of 28 prototypical community elements, each defined by graphic illustrations of urban design features and by an inventory of land use, infrastructure, socioeconomic, and trip generation characteristics. Once defined, the community elements were assigned to sub-areas within the study area, according to the objectives of each scenario (more to the US 1 corridor in the US 1 scenario, more to the nodal areas in the Community Centers scenario). This assignment process was guided by the capacities of each sub-area that were defined during an initial buildable land inventory, and the region wide control totals for population and employment growth. This process was, of course, managed through the use of GIS.

The scenarios were modeled using the normal travel demand model for the study area, with the exception that the trip generation rates of the community elements were modified to reflect the potential shifts to non-vehicular modes.

Evaluation results

The analysis showed that the Community Centers scenario significantly outperformed the other scenarios, resulting in less auto travel and lower congestion levels. Moreover, the estimated cost of implementing the Community Centers scenario is only 41% of the cost of the Cost Feasible scenario (which includes a substantial expansion of US 1). Based on the analysis, the study team determined that the substantial expansion of US 1 proposed by FDOT was not needed.

Scenarios	Dwelling Units/Acre	Daily VMT	Daily Hours of Delay	% of Land Urbanized
Base	2.21	18,629,494	61,879.30	59%
Cost Feasible	2.21	19,041,210	60,640.28	59%
US 1 Redevelopment/Infill	3.32	19,460,528	71,902.90	69%
Community Centers	2.86	18,490,918	57,721.60	73%

Elected official participation/public involvement

The project was supported by an integrated public involvement plan, which included reporting types of activities (website, newsletter, direct mail), and involvement types of activities (workshops, visual preference survey). The workshops were held in two series, the first to solicit information on major issues to be covered in the study, the second to receive opinions on the location, type, and intensity of future growth in the study area. The study

team used this input to craft the scenarios tested later in the study. Unique in the study was the use of a “real estate roundtable,” consisting of business owners, realtors, developers, and lenders, which gave important market-based guidance in the crafting of the scenarios.

Resulting actions

The study team selected the Community Centers scenario as the preferred alternative, identifying it as the new vision for the region. The study outlined a number of necessary implementation measures, including: creating a limited waiver system to the state’s concurrency requirement so that additional development can occur in the indicated centers, despite the existence of congested roadways; regular joint meetings of the two MPOs in the region, and their constituent local governments; a monitoring system to measure progress toward achieving the scenario’s vision; establishing a process to define and classify activity centers through the local government comprehensive planning process; creating a multi-modal transportation district for the US 1 corridor, as is provided for in state law; preparing design guidelines and standards for redevelopment in the existing and proposed new centers; amending the long-range plans of the two MPOs to be consistent with the scenario; and establishing a system to prioritize other infrastructure investments to be consistent with the scenario.

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17th Street Extension and Atlantic Steel Redevelopment Project

Sponsor: Lead agency: EPA

Completion Date: 2000

Source: Environmental Assessment: 17th Street Extension and Atlantic Steel Redevelopment Project
<http://www.epa.gov/projectxl/atlantic/assessment.pdf>

The primary motivation for this study was to facilitate redevelopment of a centrally located brownfield site near downtown Atlanta into a transit-supportive community, and to qualify this redevelopment and the associated transportation improvements as a Transportation Control Measure (TCM) under the federal Clean Air Act. Qualifying the project as a TCM was necessary because of the Atlanta region's lapse in conformity between its long-range transportation plan and the Georgia State Implementation Plan under the Clean Air Act.

The nature of the scenarios

The study evaluated several classes of scenarios, each focusing on a different variable. Included were evaluations of alternative site designs for the proposed redevelopment, several different alternative transportation approaches (location of projects, highway access issues, intersection improvements, and transit access options). Of particular interest were the evaluations of alternative locations and alternative site designs. All of the scenarios assumed the same amount of development: two million square feet of high-tech office space, 2,400 residential units, and 1,000 hotel rooms.

The analysis of alternative locations evaluated four scenarios:

Atlantic Steel: the location of the proposed redevelopment project, this site is situated across an interstate freeway from mid-town Atlanta.

Cobb/Fulton County: located at the intersection of two of the region's freeways, the site, currently dominated by light industry and warehouses, is economically depressed (it's an "empowerment zone") and is served by the bus system, with connections to the MARTA rail network.

South Henry County: a greenfield location at the southern fringe of the metropolitan area, this site is the furthest removed from regional activity centers and the transit network.

Perimeter Center/Sandy Springs: an “edge city” site with one of the region’s largest employment concentrations, and is served by the MARTA rail system and the regional freeway network.

The analysis of alternative design assumptions also used four scenarios, all focused on different ways to design the redevelopment of the Atlantic Steel site:

Generic: a prototypical development design based on recent trends for similar developments in the region.

Atlantic Steel Proposed: the site design initially proposed by the developers.

DPZ: a significant redesign of the site by Duany Plater-Zyberk using a neotraditional town design approach.

Atlantic Steel Redesign: the proposed site design, as modified by elements of the DPZ design and the outcome of a community-based design charrette involving government agencies, the developers, and members of the surrounding community.

The evaluation process

Because of the study’s focus on air quality issues, the primary measurement used in the study was of VOC and NO_x, the precursor chemicals to ground-level ozone, and the transportation statistics necessary to calculate those measurements.

The analysis of alternative locations relied on the standard transportation and air quality modeling tools customarily used in the region.

The site design analysis relied on the use of the INDEX@ GIS tool, which measures land use and site design characteristics. The regional travel model was then used to calculate travel patterns for the Generic design scenario. These patterns were then modified, based on the degree of design variation measured by INDEX@, to reflect the influences of land use mixing and pedestrian friendliness.

Evaluation results

The analysis demonstrated that developing the Atlantic Steel site instead of the other options would result in substantially fewer VMT and significantly lower emissions of ozone-related pollutants. It also demonstrated that designs containing mixed-use development and pedestrian-friendly features exhibit significantly fewer VMT and lower emission levels.

Scenarios	Daily VMT	NOx @ Site (Tons/Day)	HC @ Site (Tons/Day)
Location: Atlantic Steel	340,300	0.400	-0.390
Location: Perimeter Center	389,672	0.548	0.754
Location: Cobb / Fulton	507,498	0.690	0.692
Location: South Henry County	518,197	0.724	0.844
Design: Generic	340,300	0.400	-0.390
Design: Atlantic Steel Proposed	327,389	0.386	-0.404
Design: DPZ	320,440	0.376	-0.414
Design: Atlantic Steel Redesign	322,790	0.381	-0.412

Elected official participation/public involvement

The development of alternative scenarios and the selection of a preferred scenario, were significantly informed by the more than 300 public and agency meetings held throughout the course of the project. Of particular note is the community design charrette, which had a significant influence on the site design of the redevelopment portion of the preferred alternative.

Resulting actions

The analysis in this study served as the basis for an amendment to the Georgia State Implementation Plan to include the redevelopment proposal and associated transportation improvements as a TCM. This represents one of the few times that changes in land use have been the basis for a TCM. As such, it provides factual and methodological precedents for further use of the strategy in the SIPs of other regions.

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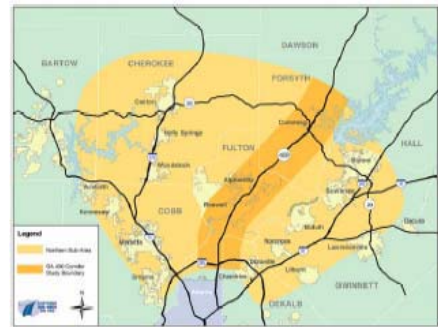
Georgia

Northern Sub-Area Study

Sponsor: Georgia Regional Transportation Authority

Completion Date: 2003 **Planning Horizon:** 2025

Source: http://207.101.65.114/info_center/default.asp



The Northern Sub-Area Study grew out of the settlement of a law suit brought by public interested organizations over the region's failure to comply with the federal Clean Air Act. The study sought to determine alternative strategies to manage current and anticipated high growth levels in the northern portions of the Atlanta metropolitan area.

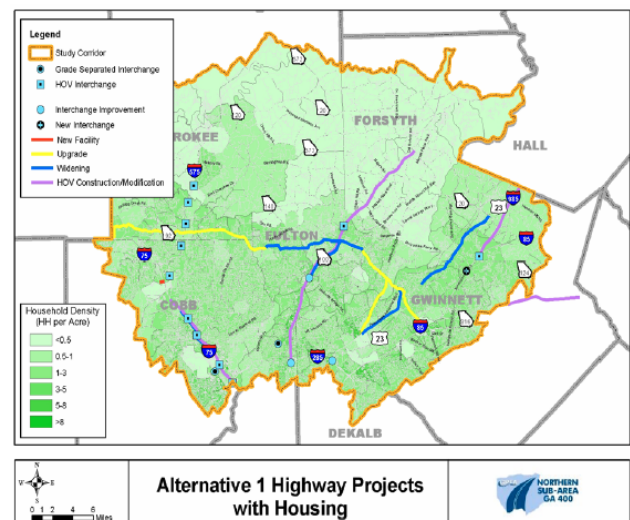
The nature of the scenarios

Seven scenarios were initially developed for the study to test a variety of concepts and assist with the construction of a base case scenario and three alternative scenarios for more in-depth study.

Baseline: includes the transportation network from the current long-range transportation plan, and the official population and employment forecasts and allocations adopted by the regional planning commission.

Alternative One – Needs Based: includes all the features in the Baseline, plus a series of targeted transportation improvements intended to improve system performance.

Alternative Two – Policy Based: assumes implementation of MPO's land use policies that focus growth in central business districts, transportation corridors, activity centers, and town centers; transportation investments prioritize transit before highway improvements and the Northern Arc highway is eliminated and replaced by improvements to existing facilities; a robust demand management package is also included.

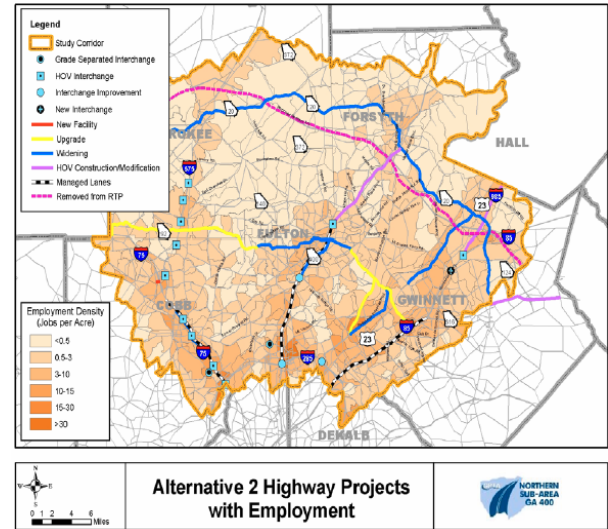


Alternative Three – Local Plans: assumes implementation of existing local government land use and transportation plans.

The evaluation process

The scenarios were tested for their relative impacts on transportation, land use, water quality, historic resources, and transportation capital and operating costs.

The PLACE3S GIS software package was used to help construct the initial seven scenarios. The land use allocation for the Baseline and Alternative One was generated using the DRAM/EMPAL land use modeling package.



Evaluation results

The Policy Based scenario resulted in the lowest levels of auto use and mobile emissions and the highest transit mode shares. It was also the least land consumptive, had the shortest average commute times and distances, and was the most expensive in capital and operating costs.

Scenarios	Daily VMT	Congested Freeway Lane Miles	Daily Transit Trips
Baseline	60,600,000	1,010	188,000
Needs Based	60,300,000	1,020	252,000
Policy Based	56,200,000	1,000	281,000
Local Plans	58,200,000	990	254,000

Elected official participation/public involvement

The initial seven scenarios were developed by a group of stakeholders that included representatives from government agencies, advocacy and neighborhood groups, and elected officials. Project staff interviewed local planners and stakeholders to refine the final three scenarios, especially the Local Plans alternative. Open houses and workshops around the study area solicited citizen input on the alternatives.

Resulting actions

The study resulted in a series of recommended highway and transit improvements to be incorporated in the region's next long-range transportation plan, and land use policies to be incorporated by the region's local governments.

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Highway 41 Corridor Master Plan

Sponsor: City of Post Falls, Idaho

Completion Date: 2002 **Planning Horizon:** 2020 & build out

Source: Highway 41 Corridor Master Plan: A Guide for Land Use and Transportation Improvements

Kootenai County, Idaho experienced a 54% increase in population in the 1990s, and anticipates another 50% increase by 2020. The increases are expected to substantially overload the capacity of Highway 41 within an area known as the Rathdrum Prairie, an area historically dominated by agricultural uses. The intended outcome of the Highway 41 Corridor Master Plan process was to integrate land use and transportation plans in the area and maintain highway function while enhancing local circulation.

The nature of the scenarios

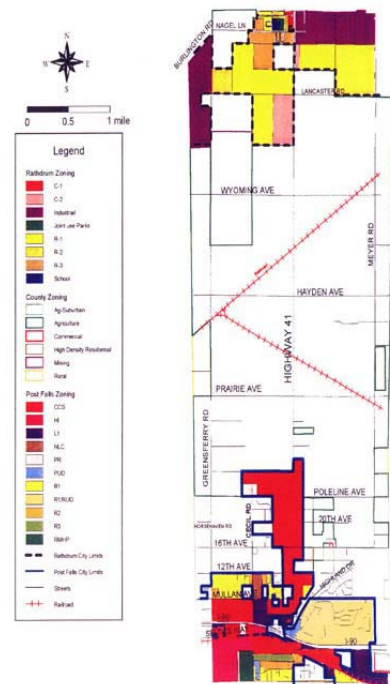
The study analyzed three land use scenarios:

Prairie Preservation Plan: continues existing development patterns with no substantial infrastructure improvements. Lack of public water and sewers would limit the intensity of development in the unincorporated areas.

Compact Mixed Use Plan: allows for mixed-use development in the corridor, with open space areas between development nodes.

Commercial Corridor Plan: allows for intense commercial and residential development the entire length of the corridor.

The transportation system elements were held constant across scenarios so that the study could focus on differences related to land use. Although not specifically included in the analysis, access control/management was a key policy element behind the study.



The evaluation process

The analysis used a limited number of indices to compare the scenarios: vehicle trips, peak hour average speeds, intersection level-of-service, and acres developed.

The analysis relied upon the travel demand modeling system typically used for transportation studies in the area.

Evaluation results

Given the significant variation in the amount of growth between scenarios, it is not surprising that the least development-intensive scenario (Prairie Preservation) had the least impacts on the transportation system and that the most development-intensive scenario (Commercial Corridor) had the greatest impacts. Somewhat interesting was that the intensity of the differences between the scenarios' impacts increased significantly at build out, compared to the 2020 figures, suggesting that the growth expected for the corridor in the next 20 years will not be as significant as the growth occurring afterward.

Scenarios	PM Peak Hour Vehicle Trips	Av. Peak Hour Speed	Acres in Agric. & Open Space
Prairie Preservation Plan	4,400	37.1	4,670
Compact Mixed Use Plan	6,250	37.1	2,880
Commercial Corridor Plan	8,100	36.8	1,570

Elected official participation/public involvement

It appears that the scenarios were developed by the study consultants, with input from government staff. Once crafted, the scenarios were presented to the public for comment at several open houses in the corridor. "Comments were generally supportive of the Compact Mixed Use Plan and included public support for the provision of open space and the continuation of agricultural uses." (p. 17)

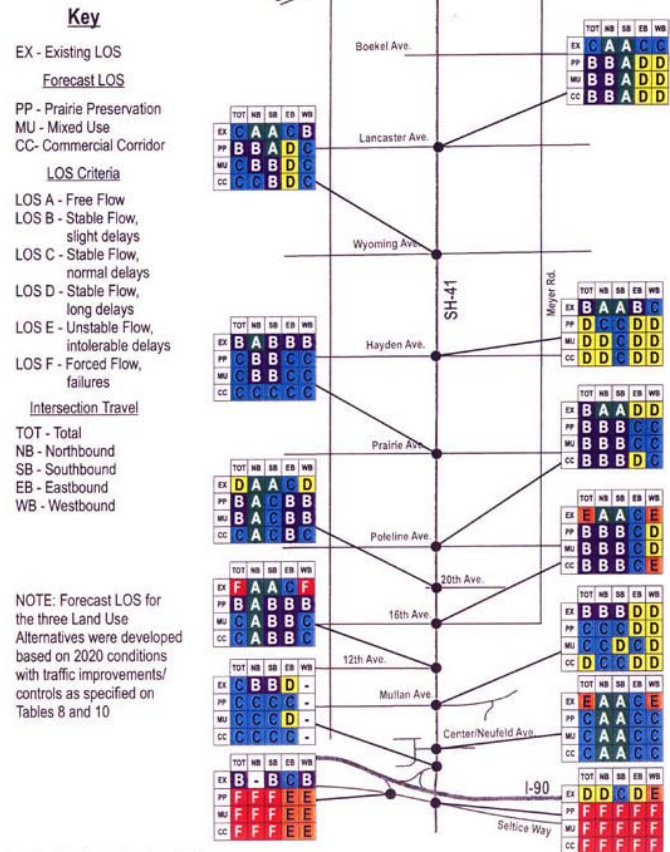
Resulting actions

The order of analysis in the project was significant. The three scenarios varied only the amount, location, and type of land uses; the transportation system assumed for the analysis included only limited improvements, and did not vary between scenarios. The objective appeared to be to evaluate the impacts of various land uses on a stable transportation

network, select a preferred land use scenario from the group, evaluate the transportation improvements needed to support that scenario, and develop an implementation plan to achieve that result.

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Treasure Valley Futures Project

Sponsor: Treasure Valley Futures Project

Completion Date: 2002 **Planning Horizon:** 2020 & build out

Source: Treasure Valley Growth Scenario Analysis Final Report (Nov. 2002)

The primary purpose of this study was to examine a perceived gap between the policies contained in many of the valley government land use plans (as reflected in the official population and employment growth forecast) and the likely outcome of future development trends based on existing zoning and land use decision making processes. As stated in the conclusion to the study: "The policies the cities are using to implement their comprehensive plans, including their zoning ordinances, are not structured to generate the outcomes envisioned by the goals in the comprehensive plans." (p. 61)

The nature of the scenarios

Three scenarios were used in the analysis:

COMPASS 2020 Scenario: the official population and employment allocation.

The Unconstrained Current Trend Scenario (2020): where the same level of population and employment growth as the COMPASS Scenario would likely occur if the 1994-2000 growth patterns were projected forward to 2020, irrespective of existing land use policies.

Comprehensive Plan Policy Buildout Scenario: assumes complete buildout of the total amount of future development allowed under existing plans, assuming maximum allowable development densities.

The evaluation process

The 2020 scenarios were measured for percentages of future development (households and jobs), and jobs/housing balance. Only the Unconstrained scenario was tested for its transportation impacts (VMT, VT, VHD, etc.). It does not appear that the buildout scenario was tested at all.

Statistical modeling was used to create the Unconstrained Current Trend scenario based on land supply, presence of existing development, and transportation accessibility.

The transportation statistics were generated using the MPO's standard travel demand model. However, because of inconsistencies in the land use data for the COMPASS scenario, completion of the model runs was possible only for the Unconstrained Current Trend scenario.

A qualitative evaluation was also included in the study, using a rating survey that was completed by participants in a bus tour of the region. The survey criteria were classified into four categories: sustainability, livability, accessibility, and mobility. Participants rated each criterion on a five-point scale (1 = poor, 5 = excellent).

Evaluation results

The only analysis providing a comparison between scenarios was in the calculation of the amount and percentage of growth allocated to rural, small town, and metro areas. This analysis showed that the Unconstrained scenario would likely result in substantially higher levels of growth to rural areas than the COMPASS scenario.

Scenarios	Daily VMT	Daily Vehicle Trips	Daily Hours of Delay
2000 (Baseline)	8,201,800	1,227,980	15,820
Unconstrained Current Trend	13,881,360	1,744,480	62,780

Elected official participation/public involvement

Participants in the bus tour/survey included area mayors, city councilors, planning commissioners, planning staff members, and business leaders. Project staff made numerous presentations to city councils and planning commissions during the course of the study.

Resulting actions

The region's MPO (COMPASS) has responded to the Futures Project by changing its methods for forecasting household and employment growth allocations. Instead of using a single forecast, based in part on political factors, the agency recently adopted three different forecasts for 2030, each focusing on a different land use pattern. The Modified Trend/Treasure Valley Futures forecast is an extension of the Unconstrained scenario tested in the Futures Project. The Impact Area Concentration forecast allocates growth to zones that have already been impacted by previous growth, with some redevelopment assumed. The

Transit Density forecast intensifies growth in rail corridors and assumes a higher degree of redevelopment. These three forecasts will be used to develop the region's next long-range transportation plan, which is scheduled for completion in December 2005.



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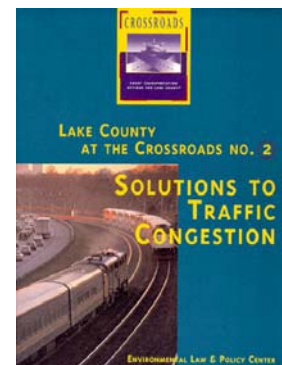
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CROSSROADS

Sponsor: Environmental Law & Policy Center

Completion Date: 1999 **Planning Horizon:** 2020

Source: Lake County at the Crossroads No. 2: Solutions to Traffic Congestion:
<http://www.elpc.org/trans/toll/xroads2.htm>



The CROSSROADS project was initiated by ELPC, a nonprofit advocacy group opposed to a proposed extension of the Illinois Tollway System (IL 53) into Lake County, a suburbanizing area northwest of Chicago. The motivation for CROSSROADS was to articulate a transportation/land use alternative to the proposed tollway extension.

The nature of the scenarios

The project analyzed three scenarios:

Local Road Improvements: includes planned improvements to existing roads in Lake County, but not the tollway extension. The scenario assumes 60,000 fewer persons in the county than the tollway scenario.

Local Road Improvements + Rail: includes the local road improvements, plus a significant expansion of the regional rail system in Lake County. It also assumes 60,000 fewer persons than the tollway scenario.

Local Improvements + Tollway: includes the local road improvements, plus the proposed tollway extension.



The evaluation process

The single index published from the study is the number of severely congested lane miles in the county. The study sponsors used a sketch plan transportation model developed by the project consultants and academics at a local university.

Evaluation results

The analysis showed that the Tollway scenario would likely result in an additional 250,000 vehicle trips a day over the Local Road scenario. This was likely due, in part, to the higher population estimate associated with the Tollway scenario. The project sponsors viewed this higher estimate as one of the impacts of the Tollway scenario – that building the tollway extension would result in a higher population level, which would lead to the higher number of vehicle trips. This, of course, significantly impacted the calculation of severely congested lane miles: the Local Roads + Rail scenario had the lowest (594), followed by the Local Roads (623), and then by the Tollway (708).



Elected official participation/public involvement

The CROSSROADS study was conducted by an advocacy organization as a way of influencing public opinion and official decision making on the tollway extension issue. The sponsoring organization proffered the Local Roads + Rail scenario to the Lake County Transportation Improvement Project (LCTIP), the official study process sponsored by the Illinois Dept. of Transportation and the state tollway authority to make decisions over the tollway and other transportation improvements for Lake County. The LCTIP assessed the proposed scenario, and rejected it.

Resulting actions

The sponsor of the CROSSROADS project continues to work toward its broader objective of promoting reduced reliance on automobile use in the Chicago area, and appears to be still active on issues related to Lake County and the proposed tollway extension.

Contact information

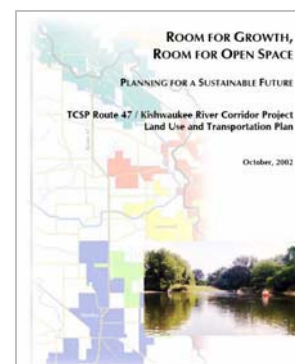
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Route 47/Kishwaukee River Corridor Project Land Use and Transportation Plan

Sponsor: Conservation Research Institute

Completion Date: 2002 **Planning Horizon:** Build out

Source: Room for Growth, Room for Open Space: Planning for a Sustainable Future (October 2002)



The main motivation for developing the Route 47/Kishwaukee Land Use and Transportation Plan was concern over anticipated impacts on water quality and wildlife habitat from conversion of agricultural and open land to development.

The nature of the scenarios

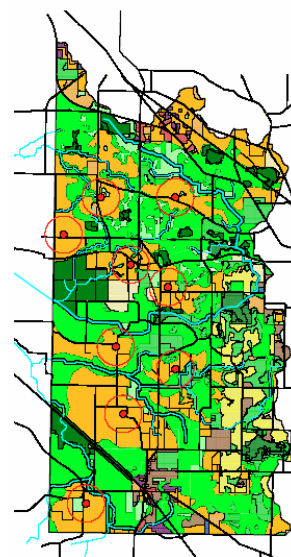
Three scenarios were developed as part of the study process:

Current Comprehensive Land Use Plans: anticipated growth patterns, as guided by existing local government comprehensive plans.

Conservation Land Use Plans: nodes of mixed-use development designed to preserve wildlife habitat, reduce water pollution, and promote transportation options; the scenario was analyzed with two transportation options:

Route 47: High quality transit service in the Route 47 right-of-way

Village: High quality transit service to the center of the development nodes



The evaluation process

A series of 20 'sustainability indicators' were selected both for testing the scenarios in the study, and for monitoring development conditions on the ground as they unfold in the future. The indicators included: Sandhill Crane population (as an indicator species), number of

summer nights you can see the Milky Way, number of asthma cases, corridor travel time, diversity of transportation choices, and business economic health.

The indices used in the study report were: amounts of habitat for Sandhill Cranes, frogs, Darters, and mussels; the amount of salt tolerant wetland plants (indicating the influence of road deicing); household vehicle trips; VMT; and fuel consumption and cost.

The key feature of this study is the method the sponsors used to develop the scenarios, a process called 'conservation-based land use & transportation planning.' The process begins with a map containing inventories of natural (wetlands, rivers, steep slopes, etc.) and human (built lands, roads, etc.) constraints. Over this is layered in succession the open space lands indicated in local plans, buffers to riparian areas and other sensitive lands, and 'natural area connections.' The remaining land is available for development of 'conservation villages.' Transportation strategies to serve the resulting development pattern were considered only at the end of the process.

The analysis of transportation impacts relied on simple calculations made with average values for vehicle trips per household by housing type, average trip length by purpose for the study area, and average trip purpose percentages. For the Conservation-Village scenario, it was assumed that there would be an 18% reduction in vehicle trips and a 10-25% reduction in vehicle trip lengths. The report shows no documentation for these assumptions.

Evaluation results

The analysis showed that the Conservation scenario would result in significantly larger amounts of medium to high quality habitat than the Current Comprehensive Plan scenario. For example, the percentage of medium to high quality Sandhill Crane habitat lands in the study area was 29% under Current Plans, but 48% under the Conservation scenario. For transportation, the Village version of the Conservation scenario had 21% fewer VMT than the Current Plan scenario.

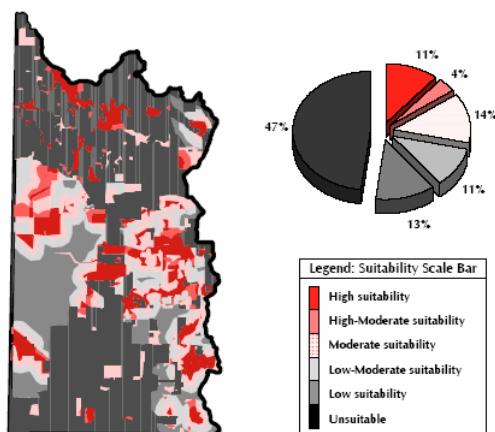


Figure IV.9 - Suitability of the current comprehensive land use plan for Sandhill crane habitat and the percentage subtotals for each category.

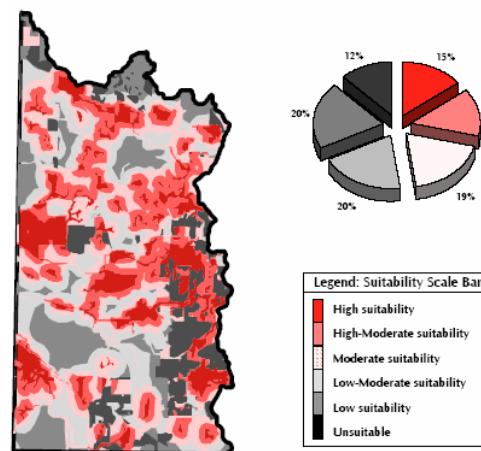


Figure IV.10 - Suitability of the conservation land use plan for Sandhill crane habitat and the percentage subtotals for each category.

Elected official participation/public involvement

The primary decision-maker for the study was the project steering council, which was made up of representatives from the city councils in the study area. The goals and analysis criteria were set by this body. At the close of the project, presentations were made to jurisdictional governing bodies throughout the Chicago area.

The project began with a direct mail survey to citizens in the study area to gauge citizen attitudes about land use and transportation issues. The returned surveys helped identify citizens who wanted further involvement in the project. The membership of a project community council was drawn from this list.

Resulting actions

In December of 2002 all participating communities signed individual and joint resolutions stating their support of the plan and intention to consider all the recommendations. In July 2003, the Illinois Department of Transportation awarded an additional \$90,000 for participating communities to develop community specific model ordinances to support the implementation of this plan.

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Impacts of Land Use Alternatives on Transportation Demand

Sponsor: Baltimore Regional Council of Governments

Completion Date: 1992 **Planning Horizon:** 2010

Source: DeCorla-Souza, Patrick, "The Impacts of Alternative Urban Development Patterns on Highway System Performance,"
<http://tmip.fhwa.dot.gov/clearinghouse/docs/landuse/ufti/ch2.stm>

This report was part of a four-city effort sponsored by FHWA in the early 1990s to assess the general concepts behind the transportation impacts of alternative land use patterns.

The nature of the scenarios

The scenarios in this study analyzed the relative impacts of shifts in residential development, while maintaining constant assumptions about the location of job growth. The existing and programmed transportation system was assumed across all alternatives.

Base Scenario: the official regional land use forecast.

Centralized Scenario: focuses household growth in the “development envelope” while allocating job growth to existing activity centers.

Decentralized Scenario: shifts a significant percentage of household growth to areas outside the current development envelope, but maintains job growth in existing activity centers.

Transit Scenario: allocates household growth only in areas well served by transit; job growth remains focused in existing centers.

The evaluation process

The study used the region’s regular travel forecasting model, and measured only the basic transportation values: vehicle trips and VMT.

Evaluation results

Scenarios	VMT		Vehicle Trips	
Base Scenario	average daily	64,757,200	average daily	5,551,700
Centralized Scenario	percent change from Base	-0.9%	percent change from Base	-0.6%
Decentralized Scenario	percent change from Base	1.8%	percent change from Base	0.6%
Transit Scenario	percent change from Base	-0.7%	percent change from Base	-0.5%

The analysis indicated that the more compact scenarios were associated with lower levels of auto use. Interestingly, higher levels of congestion were indicated for the Transit scenario, but not for the Centralized scenario.

Elected official participation/public involvement

As a technical analysis, this study had little or no elected official or citizen involvement.

Resulting actions

The study was not intended to result in any direct policy or institutional initiatives.

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Baltimore Metropolitan Council Long-Range Transportation Plan

Sponsor: Baltimore Metropolitan Council

Completion Date: 1996 **Planning Horizon:** 1995-2020

Source: Todd A. Steiss. "Testing the Impact of Alternative Land Use Scenarios Using a Travel Demand Forecasting Model," from the 5th Conference on Transportation Planning Methods Application. Washington, DC: TRB (1996).

This study was based on a perception that ISTEA and CAA required severe non-attainment areas to consider "variations in existing land use plans" as a way to reduce VMT and VT, and hence air emissions." It also responded to stakeholder criticism for not considering land use alternatives in the 1993 long-range planning process.

The nature of the scenarios

Six alternatives were considered—a trend alternative with two different transportation/policy packages, three initial land use alternatives, and a final composite alternative. All options contained the same regional totals for overall growth in households and employment. The four alternate scenarios were based on the reallocation within the region of 10% of expected future growth (both households and employment).

Long-Range Plan & Baseline: locates nearly half of current households and jobs within the Beltway; 250,000 jobs and 200,000 households are expected by 2020, representing growth of 19 and 25 percent, respectively; 90% of this growth is expected to be located outside the Baltimore city limits (outside the Beltway) under trend conditions.

Inside Beltway: reallocates growth from zones outside the Beltway and assigns it to zones inside the Beltway.

Fixed Transit: zones receiving reallocated growth are all near rail transit stations.

Community: Zones receiving reallocated growth are "identified for conservation and/or concentration of community growth."

Composite: combines elements of the Beltway and Community alternatives: growth inside the Beltway, growth is allocated according to the Beltway alternative; outside the Beltway,

growth is clustered according to the Community alternative, essentially emptying current rural areas of future growth.

Transportation elements: The Long Range Plan alternative assumes construction of all projects in the plan. The other alternatives assume only the 2020 “baseline” highway and transit network (financially committed projects only). “Transportation Control Measures” (TCMs) from the existing long-range plan (an Employee Commute Option (ECO) program for large employers and a parking charge increase for the CBD) are included in the Long Range Plan scenario, but not the other alternatives.

The evaluation process

The transportation measures used to assess the scenarios include VMT, vehicle trips, and transit ridership. The only air quality measure utilized is for NOx, and only for the Plan and Composite scenarios.

Results were obtained using the region’s existing 4-step travel forecasting model (MINUTP). MINUTP is well-known to technical staff and policy makers, making it simple and quick to use. This meant that data requirements were modest and that work schedules could be met predictably.

Evaluation results

All statistics were presented in comparison to the measurement of the Baseline scenario.

Scenarios	Daily VMT	Daily Vehicle Trips
Baseline	--	--
Long Range Plan	-300,000	-185,000
Inside Beltway Development	-190,000	-5,000
Fixed Transit Development	-250,000	-15,000
Community Development	-180,000	0
Composite	-810,000	-50,000

There was some surprise at the low vehicle trip reduction numbers among the land use alternatives. No explanation was made for this result, except to note that the much higher VT reduction under the Plan alternative was likely due to the latter’s inclusion of the TCM package. This implies a relatively stronger role for pricing mechanisms in reducing trips,

compared to land use strategies. Another possible explanation is that the model was more sensitive to price signals than the elements of the land use alternatives.

The strong VMT reduction under the composite alternative was attributed to the near elimination of growth from zones that are currently rural in nature.

Resulting actions

There is an indication that the BMC planned to incorporate the Composite alternative into the current Plan network of transportation projects and to use the analysis to evaluate the Plan's TCM package. This would then be the basis for making adjustments to the transportation projects included in the Plan.

Assessing the feasibility of policies to implement components of the land alternatives was noted as an important follow-on action. Reference is made to a process to calibrate a land use model for future studies.

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Sponsor: Baltimore Regional Transportation Board

Completion Date: January 2003 **Planning Horizon:** 2030

Source: Vision 2030: Shaping Our Region's Future Together – Final Report
<http://www.baltometro.org/V2030/V2030report.pdf>

The study was motivated by a general concern about a series of quality of life issues, both in their present and likely future conditions. Included in these concerns were issues relating to crime, education, jobs, and transportation.

The nature of the scenarios

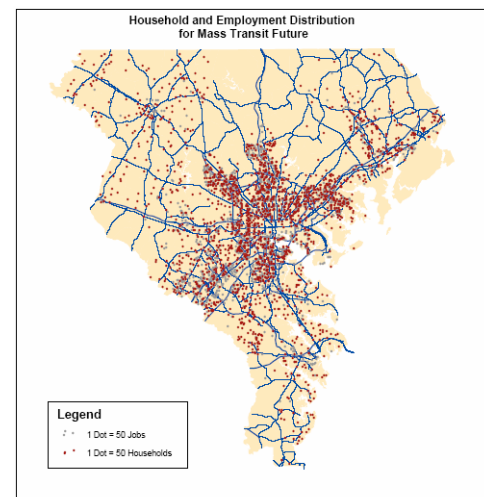
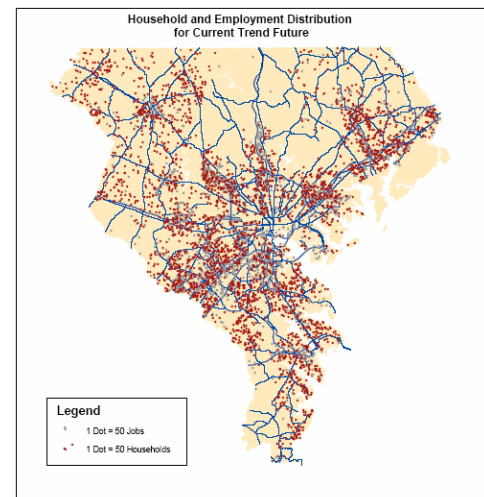
The study analyzed five different scenarios: the trend plus four scenarios intended to illustrate a wide range of development options.

Current Trend and Plans: follows existing transportation and land use plans.

Emphasis on Road Capacity: provides an example of how the region could develop if road capacity expansion were emphasized.

Emphasis on Mass Transit: an example of how the region could develop if road capacity remained at current levels and transit capacity was substantially expanded.

Emphasis on Redevelopment: how the region could develop if redevelopment were emphasized, road capacity maintained at current levels, and transit capacity moderately expanded.



The evaluation process

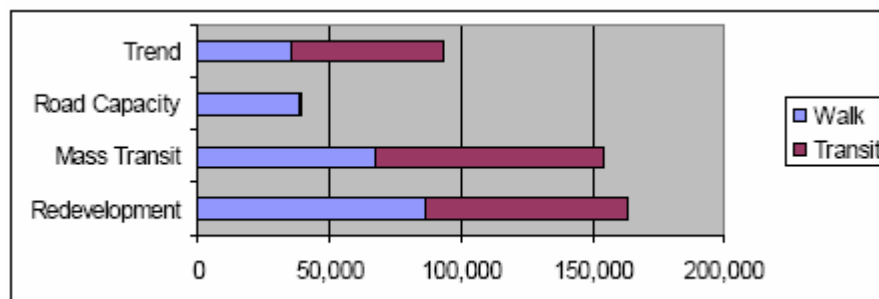
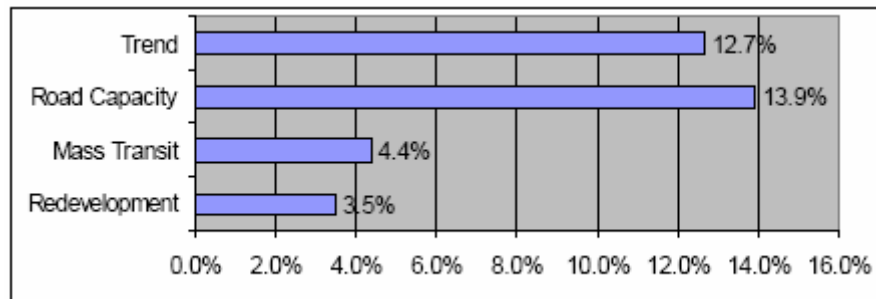
After the establishment of the Trends scenario, stakeholders established a series of 18 core values and 73 principles on which to base the other scenarios. Once crafted, the scenarios were assessed using 10 indicators measuring impacts on land consumption, transportation, vehicle emissions, and water quality.

To develop the scenarios, the study team first created three prototypical development patterns, reflecting trends occurring in the Baltimore region or nationwide: conventional development on undeveloped land; and mixed-use walkable communities, both on undeveloped land and on redeveloped land. These were then used as the building blocks for constructing the scenarios.

The scenarios were tested using the regular MPO travel demand/air quality models, as enhanced to improve sensitivity to variations in land use density, diversity, and design.

Evaluation results

The analysis showed that the Redevelopment scenario resulted in the smallest increases in VMT and land consumption. The questionnaires completed at the public meetings where the scenarios were presented indicated a slight preference for the Redevelopment scenario over the Transit scenario, both of which were ranked substantially higher than the other two scenarios.



Elected official participation/public involvement

Citizen participation efforts were interwoven at many points of the study process. The project began with a series of citizen focus groups and stakeholder interviews to get a sense of attitudes about growth, quality of life, traffic congestion, the environment, and issues related to social equity. Stakeholders were later formed into “thematic committees” to establish a series of values on which to base the scenarios. Beyond the establishment of these values, it does not appear that citizens or stakeholders had a direct role in the crafting of the scenarios. Public meeting participants did, however, complete detailed questionnaires indicating their preferences among the scenarios presented. Toward the end of the study process, multiple public meetings were held to fashion a series of 15 vision statements and over 100 strategies. These were opinion tested through a random telephone survey of the region’s citizens. A final workshop was held to refine the vision statements and strategies.

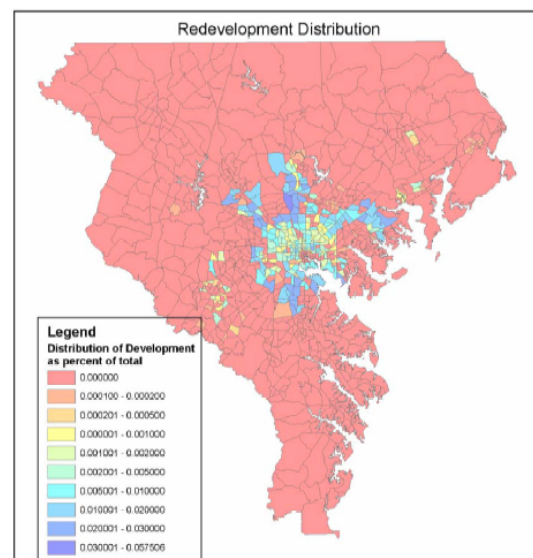
Resulting actions

The scenario planning part of the study seemed to serve mainly as a process for engaging discussion about vision statements and strategies, which constituted the final product for the project. In other words, the object of the study was not the selection of a preferred scenario, or some alternative future land use map, but the creation of a policy plan with generally described actions.

The final chapter in the study is devoted to implementation. Rather than have specific recommendations/decisions, however, the chapter outlines strengths and weaknesses of using existing organizational structures, and describes four basic options: a spin-off organization derived from the study process/structure; a restructured Baltimore Metropolitan Council; a new, independent entity; and existing organizations. These recommendations and observations provided the basis for additional analysis by the study team.

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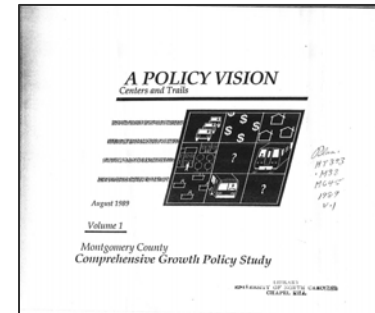


Montgomery County Comprehensive Growth Policy Study

Sponsor: The Maryland-National Capital Park and Planning Commission

Completion Date: 1989 **Planning Horizon:** 2020

Source: Replogle, Michael. Land Use/Transportation Scenario Testing: A Tool for the 1990s. Presented at the Transportation Research Board 1993 Annual Meeting.
<http://tmip.fhwa.dot.gov/clearinghouse/docs/landuse/luts/>



Montgomery County Comprehensive Growth Policy Study:
 Vol. 1: A Policy Vision – Centers and Trails.
 Vol. 2: Alternative Scenarios – Analysis and Evaluation.

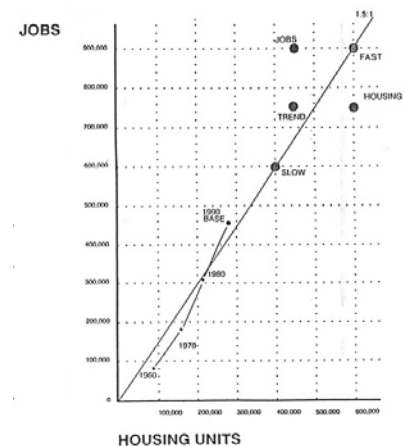
The Comprehensive Growth Policy Study was done in the context of rapid growth in the late 1980s, and responded “to four major questions concerning the ability of the County to handle growth for the period of 30 to 40 years into the future. The questions [were] organized under four different topics, called congestion, affordability, policy, and management” (Vol. 1, abstract).

The nature of the scenarios

To address the congestion questions, scenarios were developed using three basic building blocks:

Growth rates/balance:

FAST: rapid growth, with a jobs/housing balance of 1.5
 SLOW: slower growth, also with a jobs/housing balance of 1.5
 JOBS: rapid job growth, with slower housing growth (J/H ratio: 2.0)
 HOUSING: rapid housing growth, with slower job growth (J/H ratio: 1.25).



Transportation systems:

AUTO: build out of current highway master plan

VAN: added HOV lanes to AUTO

RAIL: added 65-mile light rail network to AUTO

Land use allocation, urban design, pricing assumptions: Three sets of assumptions were developed, each with an increasing level of intervention.

The transportation and land use/design/pricing elements were combined to create three basic “geographic” scenarios:

AUTO: used the AUTO transportation system, a land use pattern (based on current zoning) with dispersed origins and destinations, and weak design/pricing elements.

VAN: used the VAN transportation system, dispersed origins (based on current zoning) and concentrated destinations (clustered at rail station areas), and moderate design/pricing elements.

RAIL: used the RAIL transportation system, concentrated origins and destinations (clustered at rail station areas), and strong design/pricing elements.

These geographic scenarios were combined in various ways with the four growth rate assumptions to create 10 ultimate scenarios. These were compared to a TREND scenario, which reflected a continuation of current land use and transportation trends and was developed consistent with the official regional forecast.

Though the scenarios did not include variations in global socio-economic conditions and changes in technology, those factors were addressed in separate volumes (3 & 4), where a series of experts offered opinions on influences that could affect the county.

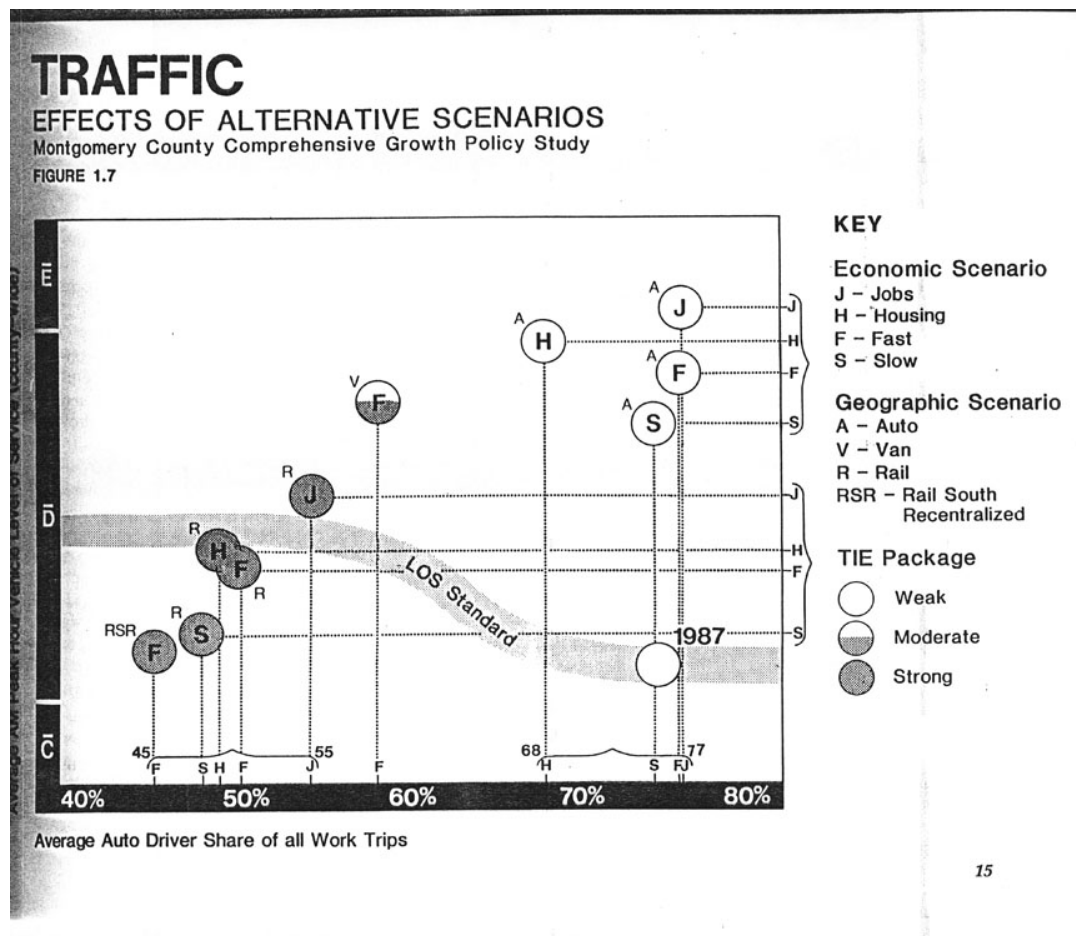
The evaluation process

The study used “vehicle traffic congestion (i.e., the number of vehicles per lane of roadway) as the basic reference point for the discussion of all the other aspects of urban growth” (Vol. 1, p. 6). Congestion was measured county-wide using the standard LOS rankings of A-F. The study notes that this is a crude measurement, but it is also “provides a relatively easily understood gaming board, with which to conduct a public discussion” (Vol. 1, p. 14). The study also acknowledged the large impact that regional growth patterns outside county boundaries could have on intra-county conditions.

Montgomery County’s regular travel forecasting model, TRAVEL, was used. It was based on the EMME/2 four-step framework.

Evaluation results

According to the study, "the most prominent result is that all the AUTO scenarios show unacceptably high levels of traffic congestion," regardless of which growth assumption was used. On the other hand, most of the RAIL scenarios achieved LOS levels acceptable under the county's Comprehensive Growth Policy. The primary conclusion was that the pattern of growth is a more important factor in influencing congestion levels than the rate or composition of growth. Also apparent was that the auto share of work trips would need to drop from the base level of 75% to 50% to continue compliance with the Growth Policy's LOS standards.



Elected official participation/public involvement

A single public workshop was held at the beginning of the study process, in part to solicit ideas that could guide the development of the scenarios. The study process was also guided by a "Commission on the Future," an appointed group of civic and business leaders.

Resulting actions

In the words of the study itself, “the CGPS is a study, not a plan. No specific actions by the Planning Commission, County Council or County Executive are necessary. The documents are intended to provide a background frame of reference for use as appropriate in such future decision making as the adoption of individual Master Plans, Annual Growth Policies, Capital Improvements programs, etc.” (Vol. 1, p.1).

The last two chapters of volume 2 of the study focused on policy and management measures that could be used to implement some of the themes that emerged from the study process. The elements addressed were economic policy, housing policy, social policy, transportation policy, natural resources policy, community facilities policy, fiscal policy, and land use policy.

Transportation Policy Task Force

Sponsor: Montgomery County Planning Board

Completion Date: 2002 **Planning Horizon:** 2025 & 2050

Source: Transportation Policy Task Force: Final Draft Report (Jan. 17, 2002)
http://www.mc-mncppc.org/move/new_report/final_report_draft.pdf



The Montgomery County Planning Board convened the Task Force to address county-wide transportation issues and to “find solutions that improve mobility, enhance neighborhood livability and promote vital business centers” (p. 6). Previous studies indicated that the county’s present high levels of traffic congestion would become much worse. Already congestion on the county’s freeways was leading to high traffic levels, on surrounding arterials, negatively affecting neighborhood livability. Prior efforts to resolve these issues had resulted in a series of stalemates.

The nature of the scenarios

The study analyzed 5 scenarios in each of two preliminary rounds. The information gleaned from these analyses led to the construction of three scenarios for the final round of the study:

Master Plan Scenario: emphasizes road-oriented land use patterns and includes all of the transportation projects from the county’s master plan, with the exception of one controversial proposed freeway segment (the Inter-County Connector).

Road Emphasis Scenario: used the same, road-based land use pattern as the Master Plan scenario, and paired it with a road-dominated transportation network.

Transit Emphasis Scenario: allocated future growth into transit-supportive patterns, coupled with a transit-focused transportation network.

The evaluation process

An early step in the study process was to establish a general goal for each of five impact areas – transportation, growth, environment, cost effectiveness, and safety – which were then used to set quantitatively based “measures of effectiveness.”

For transportation, the study used the traditional measures of VMT, congested lane miles, and transit use, but also employed several measures of accessibility, including the number of jobs within 45 minutes' travel by car and by transit. For environmental impacts, the analysis looked at the relative impacts each scenario would have on wetlands, parks, and forested areas. Cost effectiveness was calculated for overall marginal costs, and then as a function of changes in congested lane miles, accessibility, person travel time, and rail and bus passenger miles.

The analysis used three rounds of scenario tests. Round 1 tested a wide range of possible visions for the county in the year 2050, assessing the possible outcomes from a fiscally constrained transportation system, a full build out of the county's various master plans, a focus on roadway construction, a focus on rail transit construction, and a maximum road/rail option. Round 2 tested specific networks of roadways and transitways. Round 3 narrowed the focus to two land use scenarios and tested them against three different transportation networks: the master plan projects, a road emphasis system, and a transit emphasis system.

The study team used the county's normal travel forecasting system to calculate transportation impacts, and GIS to assess environmental impacts.

Evaluation results

The analysis indicated that the Master Plan and Transit scenarios resulted in less auto use, but lower average speeds, than the Road scenario. The Transit scenario showed significantly fewer congested lane miles in 2025 than the Master Plan scenario, but slightly more than Master Plan in 2050. All three scenarios were shown to have increased congestion over current conditions, but they all also indicated higher levels of accessibility.

The calculation of cost per degree of change in person travel time showed the Transit scenario costing 600% more than the Roads scenario in 2025, but the Roads scenario costing 300% more than Transit in 2050.

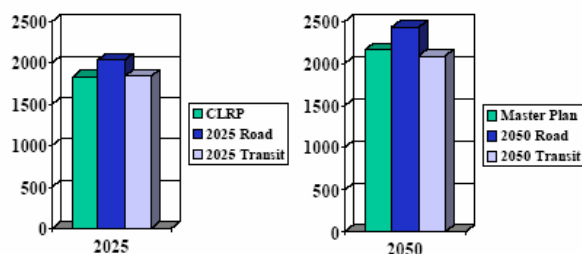


Figure 3.2: Vehicle Miles Traveled by scenario (in thousands)

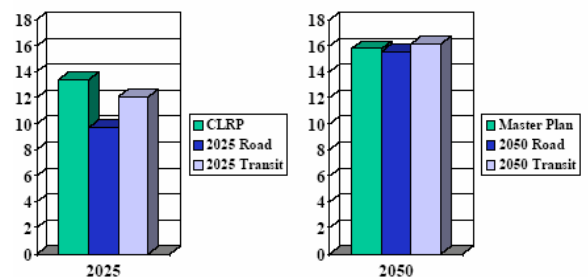


Figure 3.5: Percent Congested Lane Miles by Scenario

	1998 Base	2025 Roads	2025 Transit	2050 Master Plan	2050 Transit	2050 Roads
Total Households	308,015	402,010	402,001	480,011	478,969	480,011
Households within Half-Mile of Transit	39,263	66,012	129,118	107,285	160,132	117,876
% within Half-Mile of Transit	12.7%	16.4%	32.1%	22.4%	33.4%	24.6%

Elected official participation/public involvement

The County Planning Board appointed a group of stakeholders to the Task Force to develop a consensus package of visions, measures of effectiveness, and “combinations of land use patterns and transportation networks,” plus a series of alternative implementation policies. The Task Force’s public involvement strategy included a number of outreach activities designed to engage a broad range of participants. These activities included the creation of a web site and newsletter, outreach to community organizations, op-ed columns in local newspapers, appearances on local cable programs, focus groups, and public workshops.

Resulting actions

The Task Force was convened in an attempt to break a perceived deadlock on transportation issues in the county, particularly with regard to east-west travel. The hope was to achieve some level of consensus on a package of transportation facilities and land use policies that could assist decision-makers in breaking the stalemate. While the Task Force succeeded in framing a number of key issues and narrowing the number of choices, it was not successful in achieving consensus (as it had defined that term for study purposes) on transportation system improvement packages. The major sticking point, it seems, was over the construction of the proposed Inter-County Connector, which did receive support from a majority of the Task Force members. On land use and growth policy issues, the Task Force rejected the transit-focused land use alternative, but did reach a measure of consensus on a series of policies, including several relating to regional-level coordination and management of land use and growth, and transit-oriented development and design.

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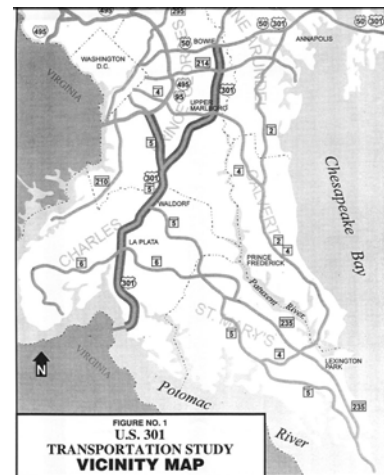
Maryland

US 301 Transportation Study

Sponsor: Maryland Department of Transportation

Completion Date: 1996 **Planning Horizon:** 2020

Source: US 301 Transportation Study Final Report & Appendices (Nov. 1996)
US 301 Implementation Policy Oversight Committee – Final Report (June 2001)
US 301 Implementation Policy Oversight Committee – Final Report (Nov. 2002)



This study was fueled by concerns over extraordinary levels of growth anticipated for the US 301 corridor of Maryland, at the edge of the Washington, DC metro area, with population in the area increasing by 90% and jobs by 50% in 25 years. This was expected to lead to the loss of more than 230,000 acres of farm and forest land in the area.

The nature of the scenarios

The study engaged in three series of alternatives analyses. First, a series of different transportation system options were tested using the official land use forecast for the study area. Included were assessments of various highway improvements, transit expansions, and transportation demand management policies. Second, a series of alternative land use assumptions were combined with transportation options selected from the first series of alternatives. These combinations, produced the following eight scenarios:

Current Plans: official land use forecast levels and allocations, with planned transportation improvements expected to be in place by 2020.

Highway Market 1: official household forecast, plus an additional 80,000 jobs above the official forecast, all allocated in a manner reflecting the likely impact of a highway expansion package.

Highway Market 2: 80,000 more households and jobs than the official forecast, allocated in response to the highway expansion package.

Highway Policy: official forecast levels of household and job growth, with a portion reallocated to areas served by the highway package.

Light Rail Market: 2000 additional households and 40,000 additional jobs above the official forecasts, partially allocated according to the likely market impact of a light rail expansion package.

Light Rail Policy: concentrates more of the growth assumed in Light Rail Market into LRT station areas

Light Rail Mixed: assumes official forecast levels, concentrated in station areas.

Enhanced Commuter Rail Policy: same growth levels as in Light Rail Policy, concentrated in possible commuter rail station areas.

After reviewing the analysis of these eight scenarios, the study task force crafted four additional options that tested a series of highway improvements with two land use variations and two transit options. From this analysis, the task force derived 45 recommendations for improvements in study area land use policies, significant expansions in the highway network, and modest improvement in the transit system.

The evaluation process

The task force professed to use 15 decision making criteria, grouped into five categories: transportation, cost, land use and economic development, environmental and community benefits, and implementation. In the statement of initial findings and conclusions, however, virtually all of the attention focused on transportation system performance, and mainly on those measures related to vehicle traffic congestion.

The alternative land use allocations used for the second set of scenarios were developed by a panel of experts (2 market economists, 2 urban planners, one transportation planner, a developer, and a banker). The panel specified two basic categories of alternative land use allocations (in addition to the official forecast) for each of three different types of transportation system expansions. The “market-driven” land use allocation assumed changes in land uses (from the official forecast) that might occur in response to the particular transportation expansion being tested. The “policy-driven” allocation approach assumed land use changes that might result from effective implementation of directive land use policies appropriate to the transportation expansion under consideration. The three transportation expansion packages were a highway based package, a light rail package, and a commuter rail package.

Evaluation results

The analysis focused on the ability of the scenarios to meet expected vehicle travel demand in the forecast year, and concluded that only a highway-based scenario would satisfy that criterion.

Scenarios	Daily Vehicle Trips on US 301	Acres of Added Development	Farm & Forest Acres Converted	Jobs / Housing Ratio
Current Plans	520,900	229,561	229,500	0.94
Highway Market 1	626,000	230,975	231,000	1.14
Highway Market 2	770,000	285,284	285,200	0.94
Highway Policy	654,000	76,071	76,100	1.13
Light Rail Market	545,000	233,600	233,600	1.05
Light Rail Policy	565,000	72,108	72,100	1.04
Light Rail Mixed	580,000	77,354	77,300	0.94
Enhanced Commuter Rail Policy	566,000	72,233	72,100	1.04

Elected official participation/public involvement

The study was directed by a 75-member task force consisting of “a cross-section of constituencies and interest groups,” including elected officials, land owners, and business and environmental leaders. The task force was aided by another 60 experts on land use, environmental protection, transportation, and economic development. The task force utilized extensive consensus-building techniques to reach a shared solution.

In addition to task force members, a total of 1100 attendees participated in 6 workshops in the study area. A public opinion survey was also conducted for the project.

Resulting actions

The Task Force recommended a series of actions to implement the study findings, including focusing future land uses into already developed areas in a compact, mixed-use fashion, achieving a better jobs/housing balance, controlling access to US 301, and building significant additions to the highway system (additional lanes and a new facility). The report’s

acknowledgement of the need for NEPA compliance before implementation of the recommendations suggests that the study could be described as an extensive scoping analysis. The report language, however, suggests that just the transportation portions of the recommendation go through the NEPA process, not the proposed land use changes. For the latter, the report recommended the establishment of an intergovernmental working group to oversee implementation.

In response, Maryland Governor Glendening appointed a Policy Oversight Committee consisting of local and state elected officials. In 2001 and 2002, the committee submitted reports outlining substantial challenges and impediments the committee faced in the implementation process, plus a series of successful implementation steps that were either completed or in progress. On transportation, the committee reported that EISs for the highway improvements were nearly complete, preparing the way for construction. On the land use side, the committee noted that the land use recommendations provided the “starting point” for the transportation EIS, but reported that most of the recommendations were still in various preliminary states (June 2002, p. 9). The report noted that there was a desire among committee members “to avoid politically charged recommendations” (Nov. 2002, p. 8).

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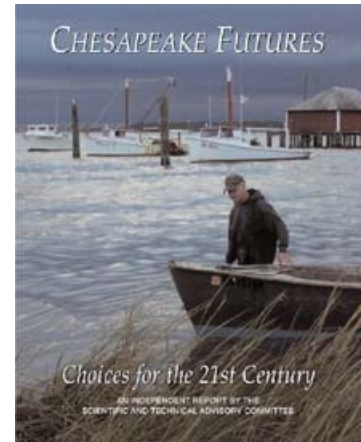
Maryland

Chesapeake Futures

Sponsor: Chesapeake Bay Program

Completion Date: 2003 **Planning Horizon:** 2030

Source: "Chesapeake Futures: Choices for the 21st Century – An Independent Report by the Scientific and Technical Advisory Committee"
<http://www.chesapeake.org/stac/futreport.html>



The study was driven by concern over the environmental health of the Chesapeake Bay, threats posed to that health by human development, and commitments made by the organizations supporting the study to restore the Bay.

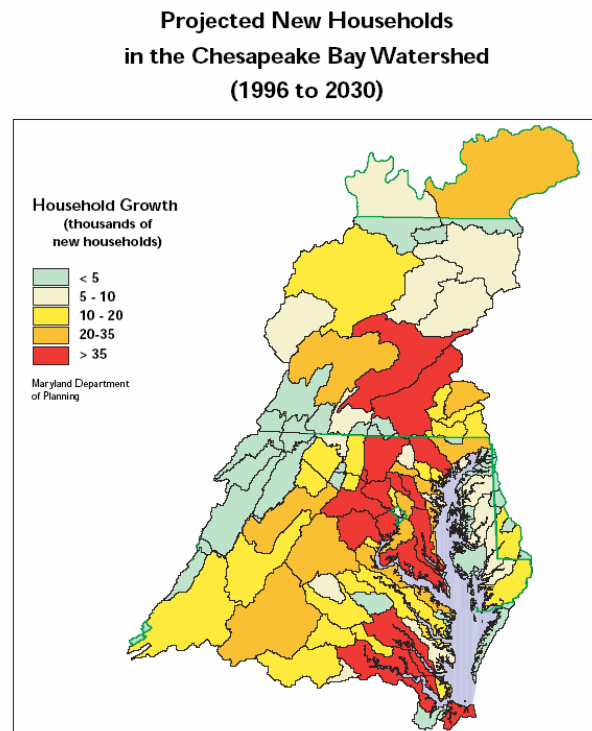
The nature of the scenarios

The authors structure the study using three different assumptions – if recent trends continue, if current objectives are met, and if feasible alternatives are implemented – for each of a series of subject areas: land use and development, forests, agriculture, technology, and the Bay and its fisheries. A story telling method provides the structure for crafting the scenarios.

Recent Trends: assumes the continuation of current trends

Current Objectives: assumes that existing obligations (mainly under several interstate compacts) for restoring the Bay are met

Feasible Alternatives: assumes the implementation of new policies and technologies to further restore the Bay, to the limit of technological capabilities and political will.



The evaluation process

The primary focus of the study is to measure the relative impacts of the scenarios on the environmental health of the Bay. As a consequence, most of the indices focus on water quality issues, such as the amounts of impervious surfaces, and nitrogen and phosphorus effluents. However, air quality, VMT, and transportation costs were also measured.

For the land use components of each scenario, the authors specify a value across a range of parameters intended to reflect the overall theme for that scenario. The parameters include agricultural zoning, growth centers, transferable development rights, environmental & resource conservation requirements, permitting of conventional septic systems, easement acquisition programs, infill/redevelopment, point- and nonpoint-source controls, and transportation systems.

Evaluation results

	Recent Trends Scenario	Current Objectives Scenario	Feasible Alternatives Scenario
Percent new households on sewer	56 – 74%	74 - 82%	90 - 98%
Acres commercial/industrial land per new household	0.10	0.06 - 0.09	0.03 - 0.04
Acres infill/redevelopment per new household	0	0.06 - 0.12	0.07 - 0.15
Acres resource land lost per new household	1.03 – 1.55	0.42 - 0.91	0.14 - 0.24
Density of new residential development (units/acre)	0.6 – 1.1	1.1 - 2.4	2.9 - 5.9
Average lot size (acres) per new household	0.91 – 1.45	0.41 - 0.93	0.17 - 0.34
Acres impervious cover per new household	0.21 – 0.31	0.13 - 0.21	0.08 - 0.11
Forest conservation on development sites	Inconsistent	5% - 25%	10% - 50%
Riparian buffer conservation on development sites	Inconsistent	50 feet	100 feet
Open space conservation on development sites	Inconsistent	10% - 75%	10% - 75%
Conventional septic system permitting	Permissive	Permissive	Restrictive
Transferable Development Rights zones: acres preserved/acres lost	Negligible	1/20	4/1
Rural land acres preserved/acres lost	Negligible	1/3	1/2

“Of the three scenarios in this report, only Feasible Alternatives appears to offer considerable promise for reversing the negative trends of the post-World War II period.” Although the Current Objectives scenario would result in some improvement in Bay conditions, the analysis showed that most of those improvements would be outstripped by population and job growth in the region.

Elected official participation/public involvement

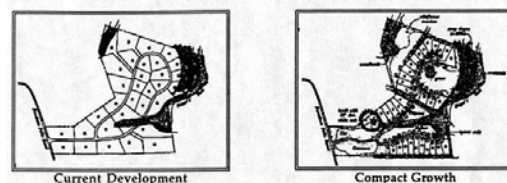
The study was undertaken as an independent assessment by the science and technology advisory committee of the Chesapeake Bay Program. Study participation was generally limited to committee members.

Resulting actions

Authored by a scientific advisory committee, the study was intended to provide “constructive advice,” not specific policy recommendations.

Fiscal Impacts of Alternative Land Development Patterns in Michigan

Sponsor: Southeast Michigan Council of Governments (SEMCOG)



Completion Date: 1996 **Planning Horizon:** 1995-2020

Source: The Costs of Current Development versus Compact Growth (June 1997)

The study was driven by concerns over the possible impacts of expected high growth in the Detroit metro area and other areas of the state. Eighteen communities across the state were selected for the study, with population growth rates of 13% to 170%.

The nature of the scenarios

Two scenarios were studied: a trend scenario and a “compact” scenario, which was created by assuming that 50% of the growth expected outside of currently built-up areas would locate in a zone adjacent to the built areas at a 10% increase in density; the remaining growth would locate outside this zone, but at a 40% decrease in density, with most structures clustered.

The evaluation process

The study used the following indices to assess the scenarios: developed land; roads (road lane miles required, road costs); water (gallons consumed, # of water hookups, water costs); sewer (gallons produced, # of hookups, costs); development costs (per residential unit, per nonresidential 1000 sq. ft.); and annual municipal cost-revenue benefits.

Evaluation results

The results indicated that compact growth used 12.7% fewer acres, 11.9% fewer lane miles, 15.1% fewer water hookups, 18.1% fewer sewer hookups and had 6.4% lower development costs and 3.2% (\$1.8 million) lower municipal costs.

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Michigan

Regional Growth: Choices for Our Future/Regional 2025 Transportation Plan

Sponsor: Tri-County Regional Planning Commission (Lansing, MI)

Completion Date: 2003 **Planning Horizon:** 2025 & build out

Source: Choices for Our Future – Technical Memoranda to Tasks II-3.1 and II-3.2 (Feb. 2003); Regional 2025 Transportation Plan (March 26, 2003)

Choices for Our Future was motivated by perceived threats to regional quality of life from the physical, fiscal, and social problems associated with sprawl development. Though the region's population growth in recent decades was modest, there appeared to be significant concern over the spreading of development and, in particular, on its potential impacts on the region's fiscal economic health.

The nature of the scenarios

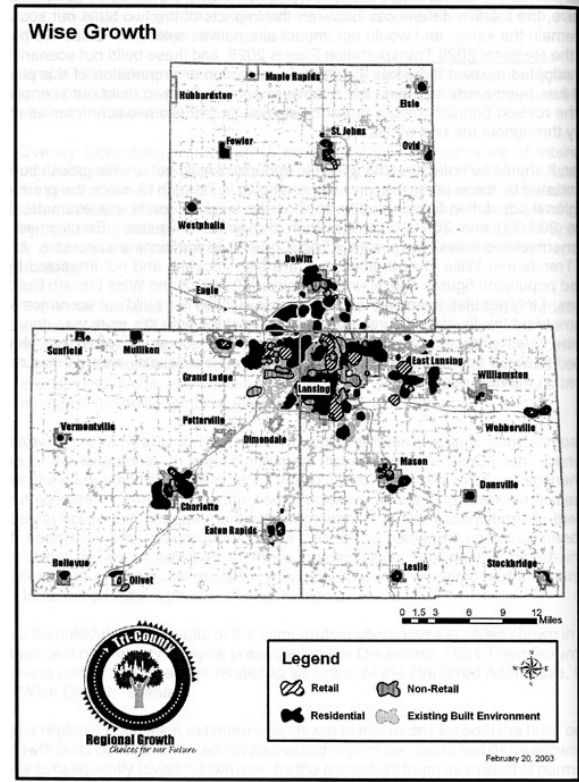
A total of five scenarios were used:

Buildout Scenario: assumes continued development according to existing zoning until full build out is accomplished.

Trend (2025) Scenario: assumes continuation of recent development trends.

Wise Growth (2025) Scenario: assumes significant amounts of urban infill and redevelopment; the majority of new development would occur in areas that already have public infrastructure and services.

Wise Growth Buildout Scenario: uses the same growth amounts as the Buildout Scenario, but assumes the same growth pattern and amount of developed land as the Wise Growth scenario.

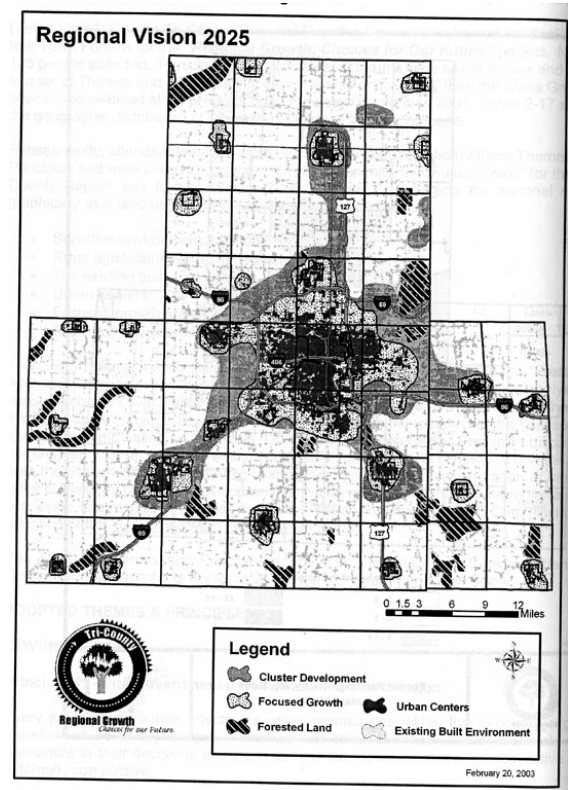


Preferred Regional Vision Scenario: uses development types from the two wise growth scenarios, but assumes an amount of developed land between the two buildout scenarios.

The evaluation process

The scenarios were tested for their impacts on transportation, land consumption (including farmland, environmentally sensitive areas, and open space), jobs/households served by transit, and the costs of public services.

The Regional Vision was developed by reverse engineering the Wise Growth scenario into a set of 29 “themes and principles,” covering government, growth and development, transportation and infrastructure, open space and resource protection, economy, and the environment. These themes and principles were then translated back into a visual representation for public comment.



Transportation modeling was done using TransCAD and TRANPLAN.

Evaluation results

The Trend and Buildout scenarios were substantially more land consumptive and costly than the Wise Growth scenarios. Interestingly, both of the 2025 scenarios (Trend and Wise Growth) had virtually the same number of VMT, while the Wise Growth Buildout scenario had approximately one-quarter fewer VMT than the regular Buildout. Also interesting was the difference in the amount of congestion: the Wise Growth (2025) scenario had approximately double the number of congested lane miles compared to the Trend, while the Wise Growth Buildout scenario had only half the amount as the regular Buildout.

Scenarios	Autos/ Household	Daily VMT	Person Trips	Congested Lane Miles
Buildout	2.07	34,531,000	4,845,500	3,225.5
Trend (2025)	1.87	16,948,000	2,609,400	55.1
Wise Growth (Buildout)	1.82	26,500,000	4,745,500	1,583.2
Wise Growth (2025)	1.83	16,900,000	2,613,900	112.4

Elected official participation/public involvement

The project's consultant presented the first four scenarios in four public forums around the region. In the seven categories of indicators used to measure the scenarios, participants indicated a preference for the Wise Growth scenarios between 81% and 89 % of the time. Based on responses from those forums, the consultant then prepared a fifth scenario, the Preferred Regional Vision, which it presented at four additional forums.

Table 2-17: Public Selection of Scenario					
	Total	Mason	Grand Ledge	St. Johns	Lansing
Wise Growth	128	34	12	35	47
Business as Usual	24	5	10	6	3
None	9	2	0	2	5

Resulting actions

The Preferred Regional Vision subsequently became the basis for a new regional land use/transportation/infrastructure plan – the Regional 2025 Transportation Plan (the official long-range transportation plan) – including the plan's forecast of future households and jobs. A draft Regional Action Plan to implement the Regional Vision was developed and included in the Transportation Plan for further public review and comment. The Transportation Plan acknowledges that the Tri-County RPC does not have land use regulatory authority; however, it does note that it has “the discretion to use these adopted documents [including the themes and principles] during their review and approval of Federal Aid projects under TEA-21, and during input and recommendation” on various state and federal grants. The agency has also created a task force to create a set of indicators for monitoring the region's attainment/compliance with the Vision.

Contact information

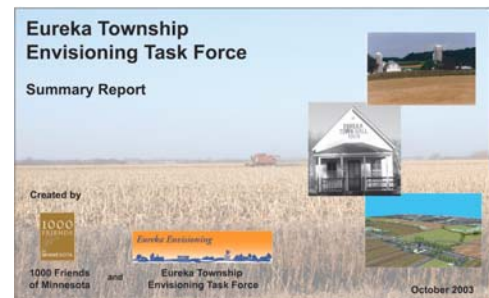
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Eureka Envisioning

Sponsor: 1000 Friends of Minnesota

Completion Date: 2003 **Planning Horizon:** build-out

Source: Eureka Envisioning Task Force Report: Exploring the Possibilities



Lying near the edge of the Twin Cities metro area, Eureka Township is faced with the prospect of rapid suburban/ex-urban growth at the expense of the area's current semi-rural character. The Envisioning project was intended to illustrate different ways in which the township might grow and possibly maintain some of its existing attributes.

The nature of the scenarios

The study examined six scenarios:

Current Zoning Buildout Scenario: development continues according to current zoning and recent trends.

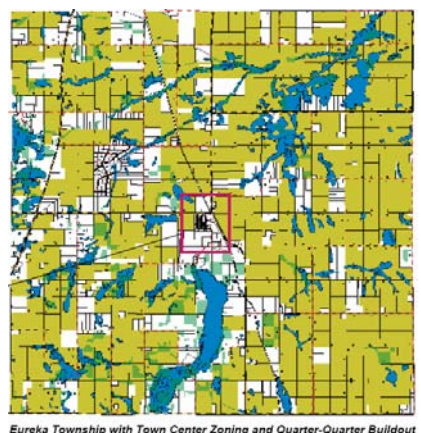
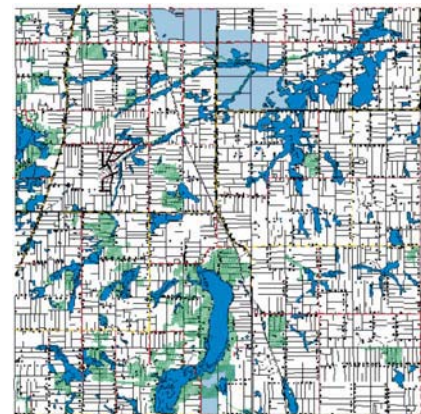
10-Acre Buildout Scenario: residential development allowed on all parcels 10 acres or larger.

Residential Cluster Scenario: residential development at an average density of one unit/10 acres, but clustered.

Town Center Scenario: zoning changed to allow for dense mixed-use development at a single town center location.

Suburban Progression Scenario: zoning changed to allow residential and commercial development at suburban densities (3 dwelling units per acre).

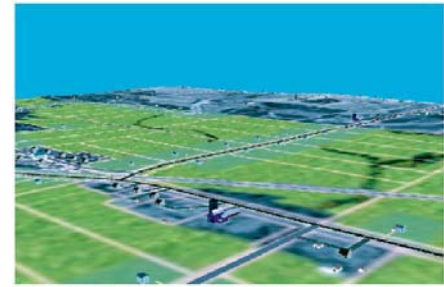
2.5 Acre Rural Estate Scenario: zoning changed to allow residential development on all parcels 2.5 acres and larger.



The evaluation process

The scenarios were measured for their impacts on population, water quality, farmland preservation, demand for new roads, and schools.

The study relied on the CommunityViz software package for creating and assessing the scenarios.

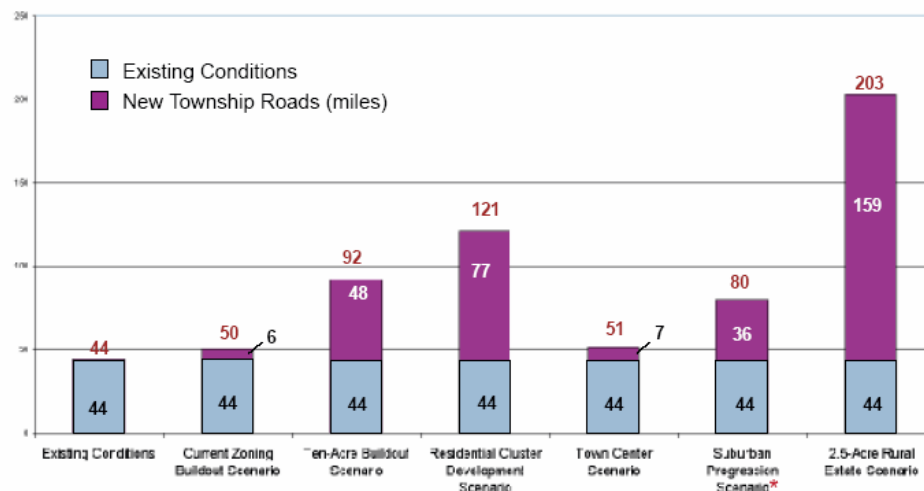


Intersection of 250th Street and Cedar Avenue (looking west)

Evaluation results

The Suburban and 2.5 Acre scenarios were substantially more costly and consumptive than other scenarios, but were fairly close to each other in relative impacts. The Town Center and Current Zoning scenarios were also fairly closely matched, but at the other end of the spectrum from Suburban and 2.5 Acre. The Cluster Scenario would protect six times more acres of farmland than the 10 Acre Scenario, but would require more than 50% more miles of roads.

Figure 2. Road Infrastructure Impacts



Elected official participation/public involvement

The study was undertaken by a task force of local citizens appointed by the township board of supervisors. The work was conducted by 1000 Friends, a nonprofit advocacy organization, “to provide Township officials with useful information that can help them to make informed decisions about future development” and to encourage greater citizen involvement in development decisions (p.3). Partial funding for the study was provided by Dakota County, where the study area is situated. The task force held a public open house to receive reaction from citizens to a series of draft scenarios; the input was used to refine the scenarios at the next stage.

Resulting actions

“[T]he Envisioning Task Force is a discussion and educational group, not a policy making group; it has no power to make planning decisions for the township. Additionally, the work of the task force has no direct relationship to past or present work on the township’s ordinances or comprehensive plan” (p.4). “It is not the intention or purpose of the Envisioning Task Force to recommend a single scenario, but rather to present a range of potential scenarios. The goal is to raise awareness and engage citizens in discussions about the future of Eureka Township” (p.8). The report concludes with a set of general recommendations for future consideration.



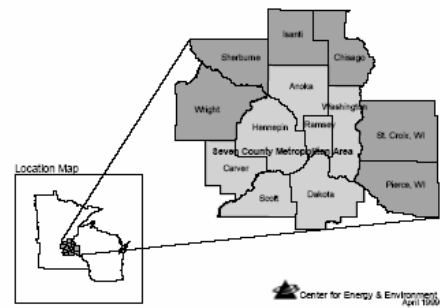
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Minnesota

Two Roads Diverge: Analyzing Growth Scenarios for the Twin Cities Region

Sponsor: Center for Energy and Environment,
Minnesotans for an Energy Efficient
Economy, and 1000 Friends of
Minnesota



Completion Date: 1999 **Planning Horizon:** 2020

Source: Two Roads Diverge – Final Report
<http://www.me3.org/sprawl/finalreport.pdf>

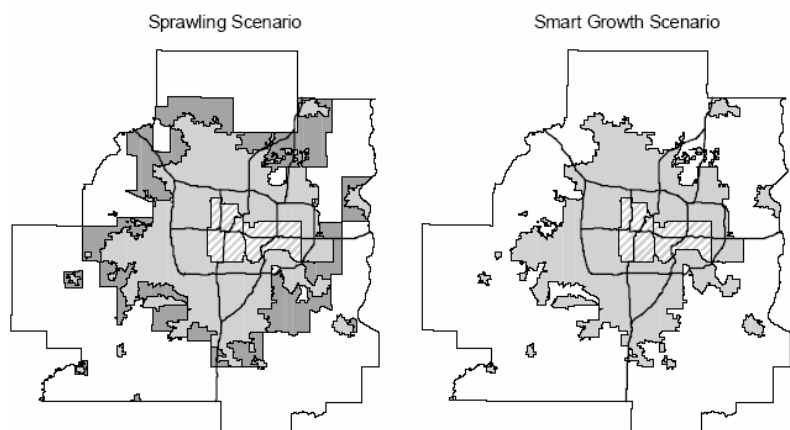
The purpose of the study was to assess (1) how the Twin Cities region should accommodate growth; (2) could the region grow and retain its unique character; and (3) the costs and benefits of sprawling growth vs. smart growth.

The nature of the scenarios

Two scenarios were used in the study:

Sprawling Scenario: assumes existing zoning and trends in the regional housing market during the previous ten years.

Smart Growth Scenario: focuses growth in areas with existing infrastructure at higher densities and mixed uses. The scenario is based on the Met Council's 1996 Regional Blueprint and the Minnesota Department of Natural Resources' Metro Greenprint project.



The evaluation process

Indices used in the project include: VMT, miles of congested lane miles, acres developed, lost acres of identified greenspace, and infrastructure costs

The travel forecasting model normally used in the Twin Cities (TRANPLAN) was used to model transportation impacts.

Evaluation results

The Sprawling Scenario was more land consumptive, was more costly, and had higher levels of VMT and congestion than the Smart Growth Scenario. The differences in congestion levels, however, were not as significant as the sponsored anticipated (just 8% more in the Sprawling Scenario). The sponsors suggested that this may be a reflection of the region's already sprawled state and its current limited access to transit.

Scenarios	Dwelling Units/Acre	Daily VMT	Additional Congested Lane miles	Acres of New Development	Local Infrastructure Costs
Sprawling	2.1	72,200,000	1,598	135,500	\$5,300,000,000
Smart Growth	5.5	73,800,000	1,480	47,900	\$2,300,000,000

Elected official participation/public involvement

The study was informed at various stages by a random telephone survey of 1000 residents of the region, focus groups, and several public forums. The study was funded, in part, by a grant from the state legislature. The work, however, was carried out by three nonprofit organizations that engage in policy advocacy to varying degrees. Other than the grant funding, there is no indication of elected official involvement in the project.

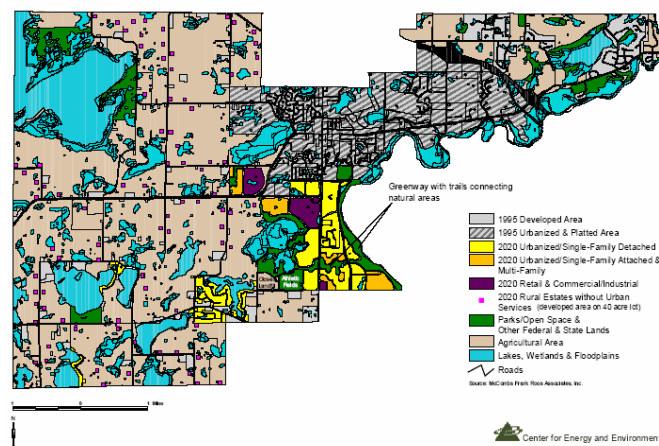
Resulting actions

The study concludes with a general call to action for policy reform, but no specific follow-on actions are listed.

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Map 9. St. Michael Smart Growth Scenario 2020 Land Use



Minnesota

Blueprint 2030

Sponsor: Metropolitan Council

Completion Date: 2002 **Planning Horizon:** 2030

Source: Smart Growth Twin Cities: Regional Development Options Report (Oct. 2002)

REGIONAL DEVELOPMENT OPTIONS REPORT



Blueprint 2030 was prepared and adopted, in part, to comply with the state law requiring the Met Council to “prepare and adopt . . . a comprehensive development guide for the metropolitan area.” MN Statutes 473.145.

The nature of the scenarios

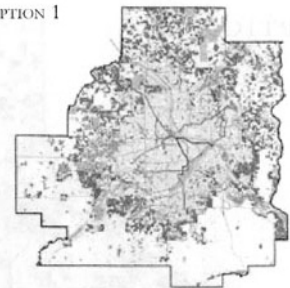
The study developed and assessed three scenarios:

Option 1: assumes that almost all future development occurs on undeveloped land according to existing zoning and recent trends.

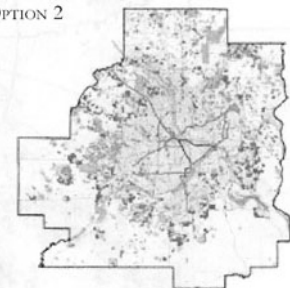
Option 2: assumes double the amount of redevelopment as Option 1 and locates 57% of households in “walkable” developments.

Option 3: concentrates development in walkable mixed-use centers along the transit network.

OPTION 1



OPTION 2



OPTION 3



The evaluation process

The scenarios were compared for their impacts on transportation, amount of land developed, costs for public service/facilities, and air quality.

Evaluation results

The analysis showed Options 2 and 3 having substantially lower vehicle miles traveled than Option 1 (13% and 17%, respectively), and significantly higher transit ridership (3 to 4 times as much).

The latter two scenarios also consumed about half as much overall land and farmland than Option 1, and had 12-14% lower total infrastructure costs.

Scenarios	Single/Multi-Family Dwellings	Daily VMT	Daily Vehicle Trips	Daily Hours Congested	Additional Tons / Day		
					CO	NOx	VOC
Option 1	68% : 32%	17,523,165	1,849,840	755,117	48.03	10.58	12.23
Option 2	58% : 42%	15,332,414	1,645,663	710,269	16.44	4.87	8.91
Option 3	50% : 50%	14,458,911	1,584,034	682,510	3.74	2.61	7.55

Elected official participation/public involvement

The project began with a series of public workshops where participants used development “chips” to indicate where and how growth should occur in their portion of the region. The resulting maps were used to craft the study’s scenarios. A further set of “community dialogues” was held to discuss the various outcomes of the growth alternatives. The process was designed for a public choice on the desired alternative/scenario, but the documentation does not indicate that such choice occurred.

Resulting actions

It appears that the scenarios studied as part of the Blueprint process were used primarily for educational/illustrative purposes. Although the scenario analysis states at its outset that “the public will choose a preferred development option,” it does not appear that a choice was made in the end. The Blueprint plan seems to focus primarily on broad policy issues, not on municipal-level zoning/land use issues. The scenarios provided several examples of how the Blueprint policies could be accomplished, and what that might mean for standard regional livability measures.

Note: The composition of the Met Council drastically changed shortly after the completion of the Blueprint study. Members of the new Met Council indicated a strong desire to scale back many of the policies in the Blueprint in deference to local government autonomy. The new council replaced the Blueprint with a Regional Development Framework in January 2004.

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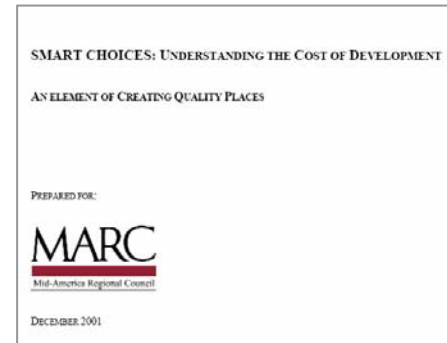
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Smart Choices: Understanding the Cost of Development

Sponsor: Mid-America Regional Council

Completion Date: 2001 **Planning Horizon:** Build out year

Source: Smart Choices: Understanding the Cost of Development – An Element of Creating Quality Places (December 2001)
<http://www.marc.org/Community/codreport.pdf>



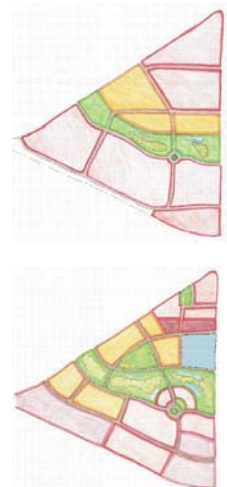
The study was done as part of a larger project “to provide tools specifically designed for Midwestern communities to promote urban and suburban development compatible with sustainable community design.” The project included the development of TOD prototypes, educational materials, and implementation strategies, plus this analysis of fiscal costs.

The nature of the scenarios

The study focused on six case study areas in the region, comparing the relative infrastructure costs of developing those sites according to two different scenarios:

Conventional: separated, lower density uses, typical of recent development trends.

Alternative: mixed, higher density uses, with more pedestrian friendly design elements.



The evaluation process

The analysis assessed only the on-site costs associated with streets, sewer, storm sewer, and water lines, and sidewalks.

The unit infrastructure costs for the case studies were developed based on consultation with engineers and developers in the area. The case study outputs were then used to build a cost of development model for the Kansas City region.

Evaluation results

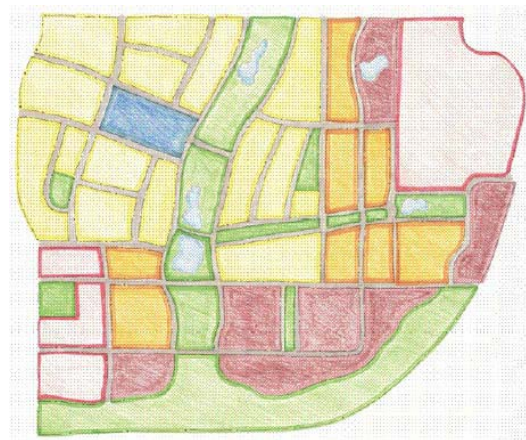
In all but one of the case study areas, the costs for the alternative development scenario were 50-75% of the costs for the conventional scenario.

Elected official participation/public involvement

The purpose of the study was to build a tool for future use in the region. As such, there was no significant involvement by elected officials or the public.

Resulting actions

It was the intent of the study's sponsor that the cost of development model resulting from this analysis would be used widely in the region to help local governments and developers understand the fiscal and economic benefits from pedestrian/transit-oriented development.



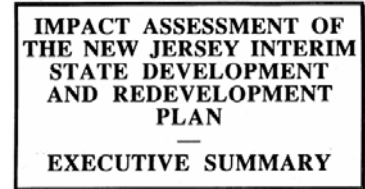
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Impact Assessment of the New Jersey Interim State Development and Redevelopment Plan

Sponsor: New Jersey Office of State Planning

Completion Date: 1992 **Planning Horizon:** 2010



Source: Impact Assessment of the New Jersey Interim State Development and Redevelopment Plan
<http://www.nj.gov/dca/osg/plan/impact.html>

Political tensions over the New Jersey planning program led the state legislature to pass a bill requiring an economic assessment of the program's fiscal impact. Sponsors of the legislation assumed the analysis would show the program to be a net fiscal drain on the state.

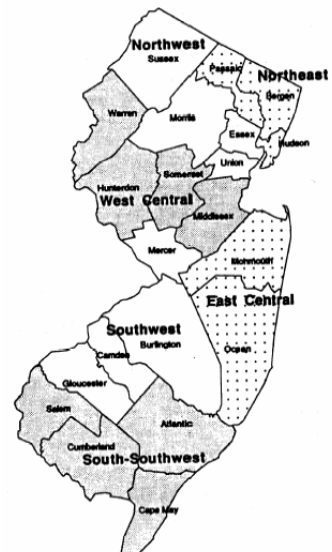
The nature of the scenarios

The analysis featured three scenarios:

Trend: growth is assigned to municipalities according to historic trends and ability to accommodate growth

IPLAN: growth is assigned assuming complete implementation of the state's Interim State Development and Redevelopment Plan.

AIPLAN: growth is allocated according to an amended version of the State Development and Redevelopment Plan that was developed, in part, as the result of additional cross-acceptance agreements, subsequent to the IPLAN scenario.



The evaluation process

The scenarios were assessed for their ability to accommodate the projected level of growth, their fiscal impacts on local and state budgets, and their impacts on agricultural land, air and water quality, public infrastructure, and governmental coordination.

Multiple models were used to complete the analysis, including econometrics models, land capacity models, air and water quality models, transportation models, water and sewer models, housing cost and quality of life models, and various capital facilities models.

Evaluation results

The analysis found that, compared to the TREND, both IPLAN and AIPLAN would result in a shift in jobs from dispersed areas of the state to more concentrated centers, lower levels of vehicle miles traveled and air and water pollution, fewer acres developed, and substantially lower capital infrastructure costs.

Scenarios	VMT	Acres Newly Developed	Sewer, Water, School, Road Capital Costs	Metric tons / year		
				CO	NOx	VOC
TREND	62,303,883,277	292,079	\$15,644,700,000	654,191	83,487	100,932
IPLAN	62,224,331,030	164,441	\$14,284,400,000	653,355	83,381	100,803
AIPLAN	n/a	117,607	\$14,210,200,000	653,219	83,363	100,782

Elected official participation/public involvement

The analysis was carried out by a large team of academics and professionals. The IPLAN and AIPLAN scenarios, however, were defined through New Jersey's cross-acceptance procedure, through which local and state government officials (elected and appointed) hash out agreements about growth and planning.

Resulting actions

The analysis in this study was instrumental in the eventual adoption of the New Jersey state plan.

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The Costs and Benefits of Alternative Growth Patterns: The Impact Assessment of the New Jersey State Plan

Sponsor: New Jersey Office of State Planning

Completion Date: 2000 **Planning Horizon:** 2020

Source: The Impact Assessment of the New Jersey State Plan
<http://www.nj.gov/dca/osg/plan/impact.html>

The assessment was completed as part of the process of adopting the State Development and Redevelopment Plan by the state legislature. When originally required by the legislature, it was assumed this analysis would indicate that the proposed plan would be deleterious to the state's economy. The prior assessment, done in 1992, indicated that the interim plan would actually improve the state's economic/fiscal situation.

The nature of the scenarios

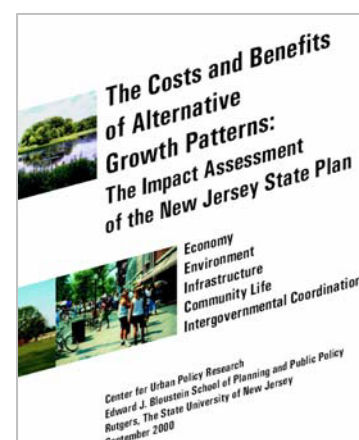
Like the 1992 assessment, this study uses two scenarios:

TREND: growth is assigned to municipalities according to historic trends and ability to accommodate growth

PLAN: growth is assigned assuming complete implementation of the draft State Development and Redevelopment Plan.

The evaluation process

The New Jersey State Planning Act requires analysis of the relative impacts of the proposed state plan compared to trend conditions for five basic areas: the economy, the environment, farm lands, infrastructure, and governmental coordination. Not surprisingly, many of the indices used in the 1992 study were used here as well, including measures of impacts on local and state fiscal capacity, agricultural land, public infrastructure, and governmental coordination. Not included in the analysis, however, was any measure of air quality impacts. The study reported that changes in mobile emissions due to locational changes in land use development patterns would likely be small, implying that the effort spent in assessing them would not be worthwhile. Also not included was a calculation of needed additional miles of state highways; given the consistent population and employment levels statewide, it was



assumed that levels of state highways would not vary as much between alternatives as the levels of local roads. Hence, the analysis focused on the latter.

Multiple models were used to complete the analysis, including econometrics models, land capacity models, air and water quality models, water and sewer models, housing cost and quality of life models, and various capital facilities models.

Evaluation results

The analysis found that, compared to the TREND, PLAN would result in a shift in jobs from dispersed areas of the state to more concentrated centers, fewer acres developed, and substantially lower capital infrastructure costs.

Scenarios	Daily Transit Work Trips	Additional Local Street Miles	Farm Acres Converted	Local Road, Sewer, Water Capital Costs
TREND	336,651	3,723	124,853	\$14,910,000,000
PLAN	348,742	2,857	56,991	\$12,590,000,000

Elected official participation/public involvement

The analysis was carried out by a large team of academics and professionals. The PLAN scenario, however, was defined through New Jersey's cross-acceptance procedure, through which local and state government officials (elected and appointed) hash out agreements about growth and planning.

Resulting actions

The Impact Assessment was completed as part of the adoption of the State Development and Redevelopment Plan by the state legislature.

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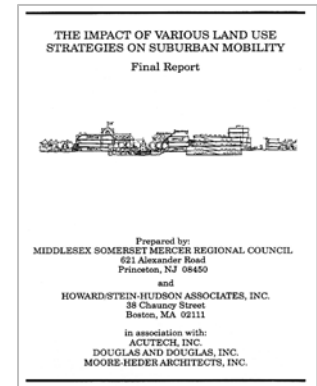


The Impact of Various Land Use Strategies on Suburban Mobility

Sponsor: Middlesex Somerset Mercer Regional Council

Completion Date: 1991 **Planning Horizon:** 2010

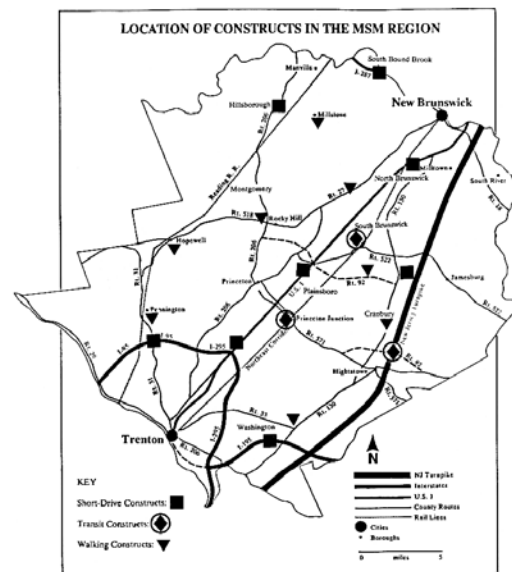
Source: The Impact of Various Land Use Strategies on Suburban Mobility
<http://ntl.bts.gov/DOCS/470.html>



The MSM Regional Council (now the Regional Planning Partnership) is a nonprofit organization in the Princeton, NJ area that advocates on land use and transportation issues. This study was conducted, with financial assistance by the Urban Mass Transit Administration (now the Federal Transit Administration), to provide general information on the degree to which transportation demand is influenced by regional land use patterns.

The nature of the scenarios

The study used three scenarios: a trend plus two alternate scenarios. The alternate scenarios were built using three “constructs” – land use development patterns that are not typical for recent suburban development. The three types were a Transit Construct, which featured a dense concentration of employment uses surrounding a transit hub, surrounded by mixed commercial/residential development; a Short Drive Construct, which was similar to, but less dense than, the Transit Construct; and a Walking Construct, which focused on high density residential uses, but minimal employment.



Trend: allocates future population and employment according to county projections produced as part of the cross-acceptance process used to develop the New Jersey State Development and Redevelopment Plan.

Scenario 1: assumes that some of the growth projected for suburban areas under the Trend will instead locate in the central cities of the region; the rest of the growth will locate in development patterns based on the three construct types.

Scenario 2: assumes Trend levels for suburban growth, but all located in construct-based development patterns.

The evaluation process

The traditional transportation network indices of vehicle trips, vehicle miles traveled, and minutes of peak period delay were used in the assessment. The study employed a GIS based model (TransCAD) using a series of trip reduction factors developed for each of the land use construct types based on ITE trip tables, case studies in the region, and various land use characteristics..

Evaluation results

Scenarios	Additional AM Peak VMT	Additional Daily Trips	AM Peak Delay (% Change)
TREND	299,000	1,740,000	65%
SCENARIO 1	168,000	687,000	20%
SCENARIO 2	202,000	1,180,000	36%

Elected official participation/public involvement

Aside from the TREND scenario, which was taken from the state's cross-acceptance planning process, there is no indication of elected official or citizen involvement in this study.

Resulting actions

No known follow-up actions were taken. The study states that the constructs used in the scenarios were not meant to be actual recommendations for development, but merely representative development types. The Princeton region has, however, subsequently engaged in additional similar analyses (e.g., the Central Jersey Transportation Forum) that may have been inspired, in part, by this earlier effort.

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Central Jersey Transportation Forum

Sponsor: Delaware Valley Regional Planning Commission

Completion Date: 2002 **Planning Horizon:** 2020

Source: <http://www.dvrpc.org/transportation/longrange/cjtf>



The study was motivated by a desire to promote coordination among numerous central New Jersey local governments, with the objective of reducing congestion and increasing mobility for east-west movement through the region. The study identified several allied issues, including the need for system-wide planning, increased transit alternatives, and integrated land use/transportation planning.

The nature of the scenarios

The study developed and assessed five scenarios:

“Do Nothing”: assumes the official growth forecast, trend land use patterns, and transportation systems that are either in existence or under construction.

Highway I: assumes the same land use/demographic conditions as Do Nothing, but adds committed highway projects.

Highway II: assumes the same land use/demographic conditions as Do Nothing, and committed highway projects, plus several additional highway links.

Transit/Land Use: assumes a center oriented Smart Growth land use pattern, light rail and other transit, travel demand management policies, and the Do Nothing highway network.

Transit/Land Use/Highway II: combines all the elements of Transit/Land Use with the highway system of Highway II.

The evaluation process

The scenarios were measured for their impacts on daily auto trips, travel speeds, vehicle miles traveled, congested lane miles, and highway volume to capacity ratios.

Evaluation results

The Transit/Land Use scenario was modestly successful in reducing congestion by shifting commuters out of their cars or off the major highways. The study showed, however, that there was insufficient ridership to justify investment in light rail.

Scenarios	Congested Lane Miles	Volume/ Capacity
Do Nothing	393	1.40
Highway I	352	0.90
Highway II	312	1.00
Land Use/Transit	361	1.33
Land-Use/Transit/Highway II	298	0.96

Elected official participation/public involvement

The study originated in a multi-jurisdictional setting, with representatives from elected bodies and government agencies. Membership in the study's steering committee was open and fluid. The scenarios were defined through a charrette process.

Resulting actions

The study did not result in the selection of a preferred alternative, but a series of policy recommendations instead. Virtually all of the recommendations were focused on some facet of transportation system enhancement, with only passing attention to land use policies.

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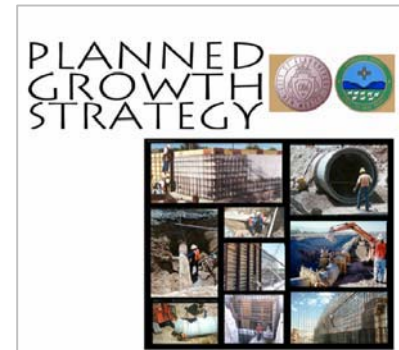


Planned Growth Strategy

Sponsor: City of Albuquerque

Completion Date: 2000 **Planning Horizon:** 2020

Source: Planned Growth Strategy Findings Report
<http://www.cabq.gov/council/pgs.html>



Growing out of two earlier scenario planning efforts—one focused on regional transportation issues, the other on 50-year regional visioning—this study was designed to identify implementation mechanisms to meet the requirements of a city “growth policy framework.” The framework called for capital improvements to foster the emergence of centers and corridors, an impact fee system based on actual costs, infrastructure provision to facilitate orderly growth, and the establishment of an urban services boundary.

The nature of the scenarios

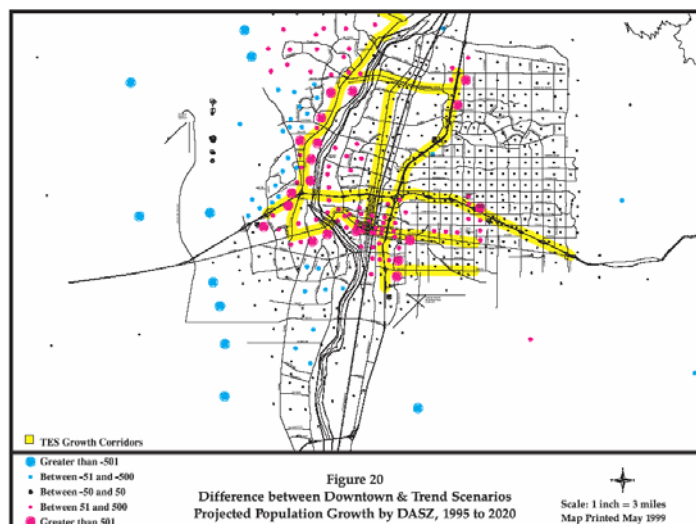
Three scenarios were used:

Trend: represents consensus opinion regarding the likely evolution and growth of the region assuming the continuation of current trends.

Balanced: balances housing and jobs on both sides of the Rio Grande in a pattern more compact than the Trend.

Downtown: “emphasizes higher densities in selected centers and corridors, with a major concentration in the downtown, university, and uptown areas.”

A fourth scenario, the Preferred Scenario, was crafted using elements taken from the Balanced and Downtown scenarios.



The evaluation process

Capital costs for water, wastewater, drainage, street, and transit were measured for each scenario, plus a measure of the total cost of transportation. Estimates were made for the respective public and private cost shares for each infrastructure type. Costs for operations were also calculated. Vehicle miles and hours traveled and transit ridership were also estimated.

The analysis for each infrastructure type followed the same process: analysis of existing capacity/deficiencies, and assessment of costs for rehabilitation of existing facilities and extension of facilities for new growth. The calculations for water costs were “based on standard engineering concepts and input from the Water Utility staff” (p. 93). Drainage costs were estimated, in part, by using an assumed cost per person/acre. Wastewater demand was calculated by converting population and employment to peak waste water flow within each sub-basin. The process to estimate transportation costs utilized the region’s regular travel forecasting model to identify capacity deficiencies. A panel of local planners identified a series of feasible expansion projects for the major facilities; expansion of minor facilities was estimated using population and employment figures. Because the travel model does not estimate mode choice, transit ridership was calculated using TRCP Report 16 equations, adjusted for each of the scenarios. The total cost of transportation was calculated using methodologies developed by Apogee, Litman, Delucchi, and Burchell that categorize costs for users, government, and society. VMT estimates were adjusted for the Balanced and Downtown scenarios to reflect assumed increased transit ridership.

Evaluation results

The Downtown Scenario had lower vehicle miles traveled and total infrastructure costs than the other two alternatives, but higher vehicle hours traveled than the Balanced scenario.

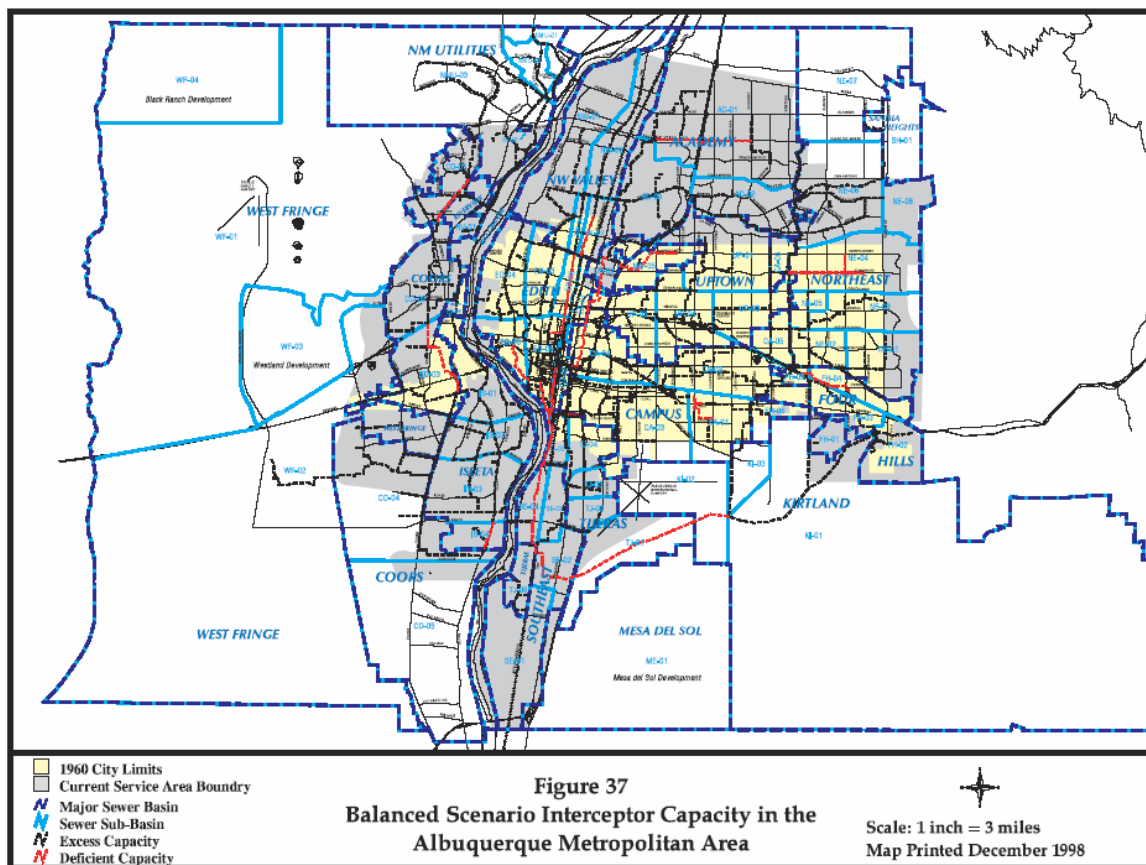
Scenarios	Daily VMT	Daily VHT	Daily Transit Riders	Water, Drainage, Sewer, Roads, Transit Marginal Capital Costs
Trend	23,784,071	739,520	49,091	\$2,115,000,000
Balanced	23,198,069	720,565	61,000	\$1,805,000,000
Downtown	23,094,955	738,370	67,600	\$1,760,000,000

Elected official participation/public involvement

Elected official participation in the study seemed to be ubiquitous. The study was initially spawned by the city government as a method of implementing the city's growth policy framework. City officials directed the creation of the Preferred scenario in response to input from local residents through surveys and town hall meetings. The steering committee for the study included a number of elected officials from both city and county governments.

Resulting actions

The study concluded with an in-depth analysis of the Preferred Scenario, and a series of detailed measures to implement it, which were subsequently adopted by the city council.



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Evaluation of the Transportation Impacts of Land Use and Development Scenarios

Sponsor: Capital District Transportation Committee

Completion Date: 1995 **Planning Horizon:** 2015

Source: Evaluation of the Transportation Impacts of Land Use and Development Scenarios

The analysis was done as part of the MPOs broader effort to development a new long-range transportation plan, titled "New Visions." At early stages of the planning process, stakeholders and citizens indicated that it was important to address development patterns as part of the update process.

The nature of the scenarios

The study developed and analyzed five scenarios:

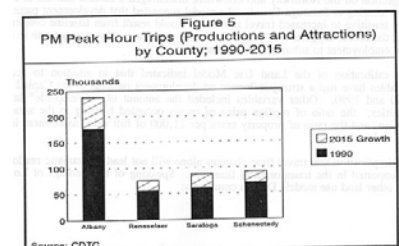
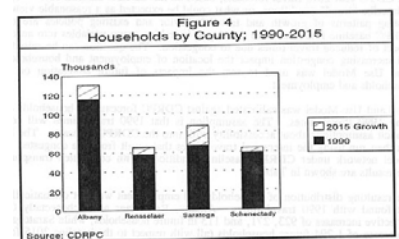
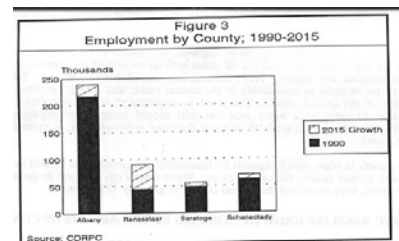
CDRPC Baseline Growth: a trend forecast developed by the Capital District Regional Planning Commission.

CDRPC Baseline Modified by the Impacts of Congestion: the Baseline scenario, as modified by a land use allocation model estimating the impacts of congestion on household and employment location.

Southern Crescent Scenario: assumes that improved/expanded sewer infrastructure in the southern portions of the region would allow for increased development in that area.

Urban Reinvestment Scenario: assumes central urban areas would attract more development through the introduction of a fixed guideway transit system and TOD zoning.

Higher Regional Activity Scenario: assumes each of the other scenarios with a higher level of growth



The evaluation process

The study focused most of its attention on the allocation of household and jobs resulting from the use of the land use model. Standard transportation measures were assessed, as well.

The analysis used a Lowry-Garin style land use allocation model that placed households and jobs at the zonal level according to the amount of developable land, house prices, property values, amount of development already there, and access to jobs/households.

Evaluation results

The Urban Reinvestment Scenario had lower levels of VMT, VHD, and HC emissions.

Scenarios	Daily VMT	Person Hours Delay	VOC (kg/hr)
CDRPC Baseline Growth	2,309,061	36,494	2,866
Urban Reinvestment	2,244,509	34,383	2,764
High Regional Activity	2,395,675	38,954	n/a

Elected official participation/public involvement

The study was directed by a committee comprised of local stakeholders.

Resulting actions

The study concluded with a series of recommendations, including admonitions that transportation investments should be focused where the region wants to encourage growth, avoid places that should be protected, and be designed to encourage the type of growth desired. Also recommended was the integration of land use and transportation planning at the corridor level, and the establishment of a regional urban services boundary. A number of these recommendations were adopted as planning and investment principles in the final 1997 New Visions plan, and were carried forward in subsequent plan updates. A current effort to update the plan through 2030 includes a substantial scenario planning component.

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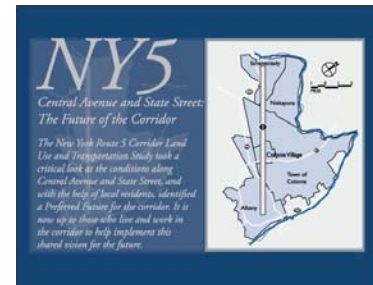
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NY 5 Study

Sponsor: Capital District Transportation Committee

Planning Horizon: 2015

Source: <http://www.ny5.org/index.html>



New York State Route 5 is an arterial/state highway that serves as main street for Albany and several other municipalities in up-state New York. Congestion on the highway has grown considerably over recent years due, in part, to land use decisions made along the corridor.

The nature of the scenarios

The study created and assessed five scenarios:

Base Scenario: represents existing land use and transportation policies and the future growth that is projected for the corridor and the region by the regional planning commission.

New Visions Scenario: assumes Base Scenario conditions with a 15% reduction in trips resulting from TDM policies in the New Visions plan.

Intermediate/New Visions Scenario: assumes the same regional growth totals as the Base Scenario, but with a larger share located in the study corridor, and transportation improvements/policies from the New Visions plan

Intermediate/Full Implementation: assumes the same Intermediate conditions, but with a high capacity transit facility in the corridor.

Stimulated Scenario: assumes a tripling of the regional growth rates, with a large portion locating in the study corridor, and a high capacity transit facility in the corridor.

The evaluation process

The scenarios were assessed for their relative impacts on various transportation measures (congestion, transit ridership, ped/bike access, safety, access management).

Evaluation results

One of the concerns of the study was to determine whether the corridor could sustain the traffic levels associated with higher development intensities. The analysis showed that the Stimulated scenario had higher traffic levels than the Intermediate or New Visions scenarios, but about the same level as the Base scenario, and that this level could be managed. All the build scenarios had lower congestion levels than Base, with the Stimulated being the highest. The measurement of VMT indicated the same ordinal results.

Scenarios	Hours of Delay (PM Peak)	PM Peak Speed	Daily Transit Ridership
Base	257	21	50,000
New Visions	113	24	50,000
Intermediate/New Visions	n/a	n/a	55,000
Intermediate/Full Implementation	118	24	70,000
Stimulated	246	21	80,000

Elected official participation/public involvement

The study team used a charette with stakeholders to refine a series of preliminary alternatives into the set of scenarios used for the study. A newsletter, website, and survey were used to elicit citizen reaction to the Stimulated Scenario, the scenario implicitly preferred by the study sponsors. The reaction was “overwhelmingly positive.”

Resulting actions

On the basis of positive citizen response, the sponsors selected the Stimulated scenario as the preferred scenario. This status was reaffirmed by subsequent updates of the New Vision regional long-range transportation plan for the Albany region. A detailed action plan was developed at the end of the study. This provided the basis for incorporating policy and investment decisions into the New Visions plan, and into local land use plans.

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Regional Development Choices

Sponsor: Greater Triangle Regional Council & Triangle J Council of Governments

Completion Date: 1998 **Planning Horizon:** 2020

Source: Regional Development Choices Project
<http://www.tjcog.dst.nc.us/rdc2.htm>

The project was motivated by concerned over anticipated high levels of growth by 2025, and the impacts that may result on regional quality of life measures.

The nature of the scenarios

Three scenarios were used in the analysis:

Suburban Expansion: continues current development trends.

Walkable Communities: focuses growth into walkable, compact, mixed-use neighborhoods & expands the light rail system.

Town and Country: focuses growth into the three major urban centers, as well as walkable neighborhoods, further expands the light rail system, and cancels two major highway projects.



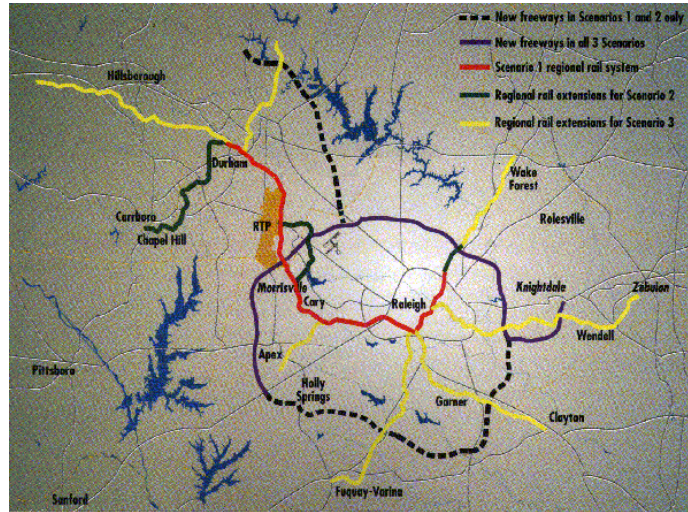
The evaluation process

Ten measures were selected to assess the scenarios, but only in a general, qualitative manner: mix of activities, concentration of development, land use and transportation, roads, greenspace, countryside, regional transit service, civic realm, centers of activity, and fiscal equity. In the words of the COG planning director:

“The 3 scenarios were general and descriptive, not detailed, and were not analyzed for performance measures (cost, VMT, etc.). They were used for a 1-year civic engagement exercise to learn what different groups of people liked and disliked about the scenarios, and in general, which of the 3 they would prefer to live in. The results of the year-long exercise was then to develop a set of regional principles that existing decision-makers

(local governments, MPOs, etc.) should use in pursuing their development, mobility and green space planning efforts.”

Evaluation results



Elected official participation/public involvement

The sponsoring organization is a civic/business nonprofit that worked with the region’s COG in developing and evaluating the scenarios. After the analysis of the scenarios was complete, the study’s sponsors engaged in “a year-long public dialogue . . . with a coalition of community groups” about the choices represented in the scenarios.

Resulting actions

The scenario analysis, and the public dialogue that followed, provided the basis for a series of eight regional development principles, establishing a “framework for improving conservation, development and mobility in the region.” The principles cover the subjects of smart development patterns, walkable communities, affordable living, green space, integrated transportation, an enhanced civic realm, mixed-use centers, and fiscal equity. Since the principles’ adoption in 1999, they seem to have played an indirect role in subsequent work by the COG in the areas of greenspace planning and protection, infrastructure expansion, and smart growth.

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Fargo-Moorhead Area Short and Long Range Metropolitan Transportation Plan

Sponsor: Fargo-Moorhead Metropolitan Council of Governments

Completion Date: 1998 **Planning Horizon:** 2020

Source: Fargo-Moorhead Area Short and Long Range Metro Transportation Plan

As part of the region's broader long-range transportation plan, the project sponsor assessed the travel impacts of a variety of land use intensities in a small group of areas at the edge of the region. The purpose was to better match future growth levels in a rapidly developing area with reasonably available transportation system improvements.

The nature of the scenarios

Six scenarios were used:

Land Use 1: assumes the trend forecast

Land Use 2: reduces retail jobs by 50% and increases non-retail jobs by 50%.

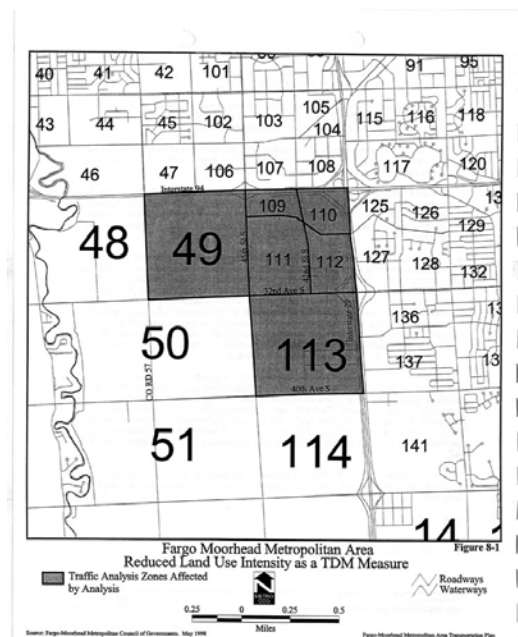
Land Use 3: reduces all jobs, and replaces the saved land with housing at trend densities

Land Use 4: same as 3, except half of the remaining retail jobs are switched to non-retail

Land Use 5: shifts 15% of growth in Land Use 1 to open space

Land Use 6: shifts 10% of growth in Land Use 2 to open space

All growth reductions were assumed to be compensated for by increases in other areas.



The evaluation process

The scenarios were tested solely for their relative impacts on traffic volumes on nearby roads.

Evaluation results

The documentation did not include specific quantifications on scenario performance, only summary conclusions of the relative impacts. Land Use 3 and 4 had the largest reductions in traffic volumes. The authors surmised this was due to the increased mixture of land uses. The authors also noted, however, that reducing land use intensity in one area could have the effect of further spreading out development, thereby increasing overall travel distances and auto use.

Figure 8-2 Land Use Scenarios Used to Evaluate Reduced Land Use Intensity as a Form of Travel Demand Management																		
T A Z #	Land Use 1			Land Use 2			Land Use 3			Land Use 4			Land Use 5			Land Use 6		
	Original Projections			Convert Retail Jobs to Non-Retail			Convert Jobs to Households			Convert Retail & Non-Retail Jobs to HH, and Retail to Non-Retail Jobs			Reduce Land Use 1 by Incorporating 15% Open Space			Reduce Land Use 2 by Incorporating 10% Open Space		
	HH	Retail	Non-Retail	HH	Retail	Non-Retail	HH	Retail	Non-Retail	HH	Retail	Non-Retail	HH	Retail	Non-Retail	HH	Retail	Non-Retail
49	1000	500	3036	1000	250	3286	1282	300	1936	1282	150	2086	850	425	2580	900	225	2957
109	0	90	510	0	45	555	0	90	510	0	45	555	0	77	434	0	40	550
110	300	250	1450	300	125	1575	461	150	950	461	75	1025	300	215	1230	300	110	1415
111	300	386	214	300	193	407	359	256	144	359	126	274	258	328	182	270	174	366
112	0	258	1565	0	129	1694	161	158	1065	161	79	1144	0	220	1330	0	116	1524
Total	1600	1484	6775	1600	742	7517	2263	954	4605	2263	475	5084	1408	1265	5756	1470	665	6812
+/- from Land Use 1				same	-742	+742	+663	-530	-2170	+663	-1009	-1691	-192	-219	-1019	-130	-819	+37
% +/- from Land Use 1				same	50% dec.	11% inc.	41% inc.	36% dec.	32% dec.	41% inc.	68% dec.	25% dec.	12% dec.	15% dec.	15% dec.	8% dec.	55% dec.	1% inc.

Elected official participation/public involvement

Local planners were consulted on the composition of the scenarios. However, there appeared to be little or no involvement by elected officials or the public.

Resulting actions

There is no indication that any of the scenarios would be implemented by local officials, or that there would be any institutional changes in land use/transportation planning.

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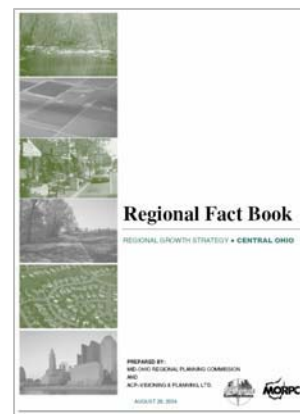
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Regional Growth Strategy – Regional Connections

Sponsor: Mid-Ohio Regional Planning Commission

Completion Date: on-going **Planning Horizon:** 2030

Source: Regional Fact Book – August 2004
<http://www.regionalconnections.org/Library/RegionalFactBook-web.pdf>



The study was driven by questions about future growth in the Columbus region. Issues of particular concern included the location of growth, possible impacts on the regional economy, the ability of public infrastructure and services to handle the growth, and implications for regional quality of life.

The nature of the scenarios

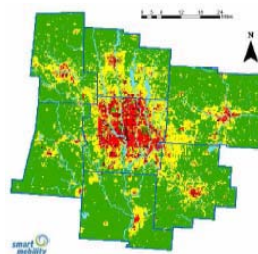
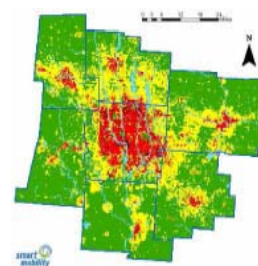
The study utilized four scenarios:

Trend: continues growth in a business as usual fashion, based on current land use plans and continued highway investment.

Shifting Inward: shifts some growth to inner parts of the region, with minor intensification and integration of land uses and continued highway investments.

Shifting Inward with Increased Transit: shifts even more growth inward, with more land use intensification and integration and major transit investments.

Aggressively Inward: increases even further the inward shift, intensification, and integration of land uses, with additional transit investments.



The evaluation process

The scenarios were evaluated for their respective impacts on land consumption; new housing in greenfields; housing density; new jobs in greenfields; and change in VMTs

A locally produced land use model was utilized to assist in crafting the scenarios. The model incorporated economic variables such as access to sewer, highways, transit, and economic incentives; and environmental variables including proximity to wetlands, and other protected areas. Other than for publicly owned lands, however, the model did not observe any absolute limitations on development.

Evaluation results

The denser scenarios showed a progressive shift away from greenfield development, and reduction in vehicle miles traveled.

Scenarios	VMT vs. Current	Total Sq. Miles Developed	% New on Greenfields	
			Housing	Jobs
Trend	46%	1,543	84%	91%
Shifting Inward	40%	1,440	84%	91%
Shifting Inward with Increased Transit	31%	1,370	73%	61%
Aggressively Inward	21%	1,186	51%	22%

Elected official participation/public involvement

The study is being directed by a steering committee comprised of elected officials and stakeholders. The study employed a series of region-wide and county-level workshops, discussion groups, and focus groups to craft the scenarios, and to gauge public responsiveness to the final versions. The workshops attracted several hundred citizen-participants, in rough proportion to the regional distribution of population.

Resulting actions

Workshop participants assisted in the creation of a series of visions statements, based roughly on the scenarios. These statements provided the basis for a series of draft strategies. How these strategies might be implemented has not been indicated.

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Region 2040

Sponsor: Metro

Completion Date: 1995 **Planning Horizon:** 2040

Source: The Nature of 2040:
http://www.metro-region.org/library_docs/land_use/2040history.pdf
 Region 2040: Recommended Alternative (September 1994)
 Region 2040: Transportation Analysis of the Growth Concepts (July 1994)
 Region 2040: Concepts for Growth (June 1994)

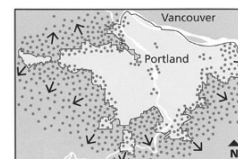


Region 2040 was motivated by concerns about the impacts that anticipated high growth rates might have on regional quality of life.

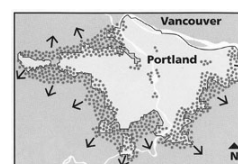
The nature of the scenarios

The project used four initial scenarios, then developed a fifth, composite scenario for formal adoption:

Base Case: assumes continuation of current policies and development trends, major expansions to the regional road network, and moderate increases in regional transit systems.



Concept A: allocates most of future growth to suburban areas, much of it to lands beyond the current urban growth boundary; includes a moderate expansion of the highway network, major increases in the regional transit system, a parking pricing demand management program, and significant improvements in the quality of pedestrian environment around the region.



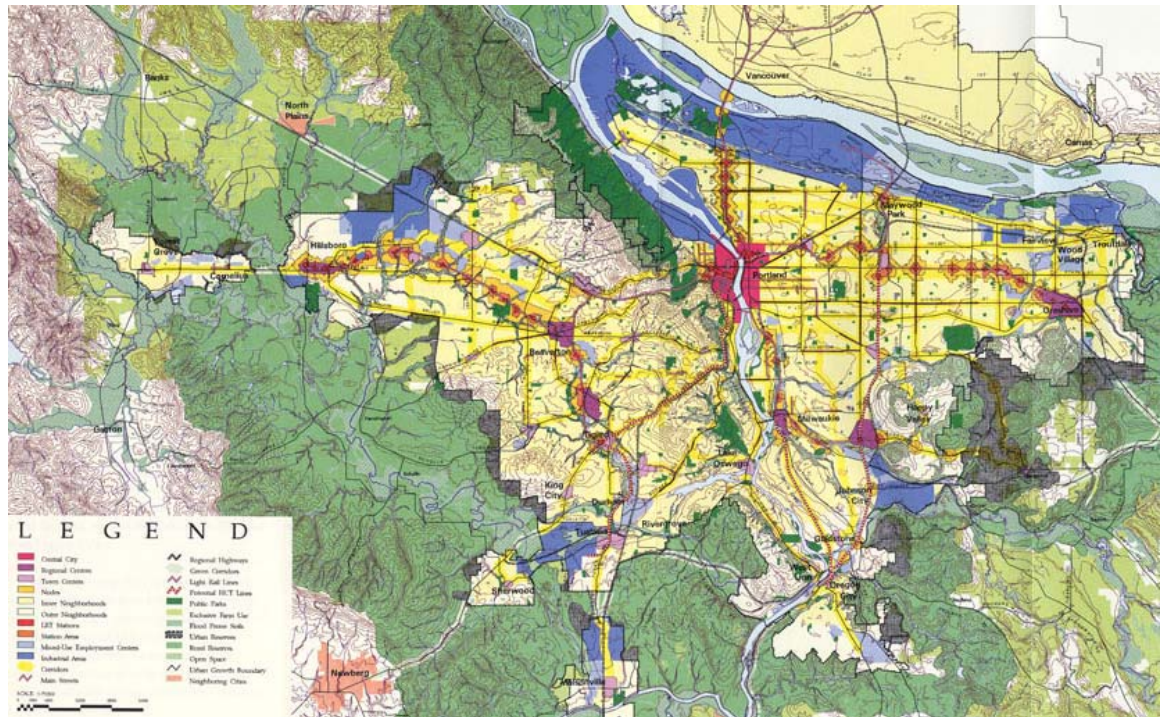
Concept B: allocates all future growth to lands within the current urban growth boundary; includes transportation, demand management, and pedestrian improvements similar to Concept A.



Concept C: assumes some expansion of the current urban growth boundary to accommodate relatively compact growth at the fringe; shifts significant amounts of growth to satellite communities beyond the



boundary; includes transportation, demand management, and pedestrian improvements similar to Concept A, with slightly more emphasis on highway improvements.



The scenarios were tested for a number of measures indicating impacts on land use, transportation, and air quality.

Evaluation results

Scenarios	Single/Multi-Family Dwellings	Daily VMT	Congested Road Miles	Acres Lost Farmland	Kg/Day		
					Winter CO	NOx	HC
Base Case	70 : 30	25,010,153	506	63,900	614,451	94,024	70,700
Concept A	74 : 26	24,262,884	682	17,200	613,537	90,987	69,810
Concept B	60 : 40	20,693,270	643	-	579,579	83,817	66,375
Concept C	69 : 31	20,010,741	404	11,400	569,091	86,988	65,745
2040 Growth Concept	65 : 35	20,602,595	454	3,543	574,749	86,230	66,391

Elected official participation/public involvement

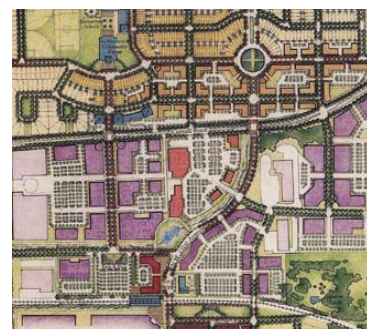
Public and elected official involvement in the project began with telephone surveys and a series of public meetings to gauge public attitudes about growth. Although agency staff was primarily involved in crafting the initial set of scenarios, the survey and public meeting information helped to inform that process. After staff completed the impacts analysis, the scenarios and analysis results were sent out to the public for review and comment. This phase of public involvement included television ads, newspaper supplements, as well as public meetings and workshops, leading to the development and adoption of the 2040 Growth Concept.

Resulting actions

The Metro Council adopted the 2040 Growth Concept in 1995. This formed the basis for a regional land use/transportation plan, which in turn gave rise to a series of functional implementing plans, including a Regional Framework Plan governing regional land use issues, and an update of the Regional Transportation Plan. State law requires local governments in the region to conform their planning and zoning documents to these two functional plans.

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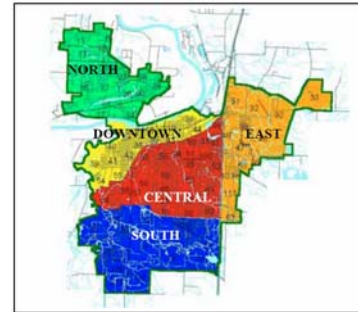
Oregon

Balanced Development Patterns Project

Sponsor: City of Albany, Oregon

Completion Date: 2001 **Planning Horizon:** 2020

Source: Project Website:
<http://www.cityofalbany.net/communitydevelopment/balanceddev/index.html>
Development Alternatives Memo



The project was carried out as part of the periodic review of the city's comprehensive plan. It was motivated primarily by concerns over anticipated high future population growth rates.

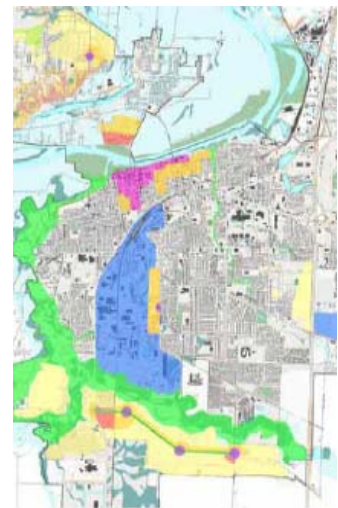
The nature of the scenarios

The project used three scenarios:

Base Case Scenario: based on current zoning, assumes continuation of current development trends.

Enhanced Development Scenario: redevelops much of the existing downtown at higher densities, plus residential clusters in other areas.

Village Concept Scenario: includes redevelopment and infill focused in several centers throughout the city.



The evaluation process

The project developed a set of "objective evaluation criteria" that included land use (acres developed, density of development, amount of redevelopment, amount of sensitive lands developed), transportation performance (mode split, VMT), environmental impacts (water consumption, impervious area, tree canopy), socio/economic issues (jobs/housing ratio), urban design (access to parks, ped-friendly design).

Evaluation results

The reported evaluation results include only subregional tallies of population and employments growth.

Elected official participation/public involvement

A set of three community workshops were held in two parts of the city. The first workshop was used to develop the scenario concepts. The second and third workshops focused on implementation issues.

Resulting actions

The process resulted in the selection of a preferred alternative. The degree to which that alternative was incorporated into existing plans and implemented is not indicated.

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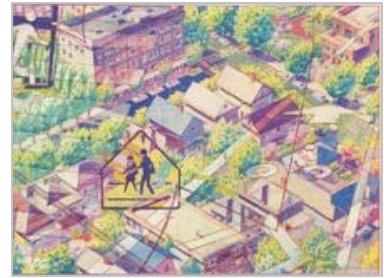
Oregon

Making the Land Use, Transportation, Air Quality Connection (LUTRAQ)

Sponsor: 1000 Friends of Oregon

Completion Date: 1997 **Planning Horizon:** 2020

Source: LUTRAQ Vol. 3: Description of Alternatives
LUTRAQ Vol. 5: Analysis of Alternatives
LUTRAQ Vol. 7: Summary Report
http://www.friends.org/resources/lut_reports.html



The LUTRAQ study was developed in response to a proposed new circumferential highway (the “Western Bypass”) outside the western fringe of Portland, Oregon’s urban growth boundary. The objective of the study was to determine whether an integrated land use, transportation, demand management scenario could be effective in responding to the region’s needs for mobility and accessibility.

The nature of the scenarios

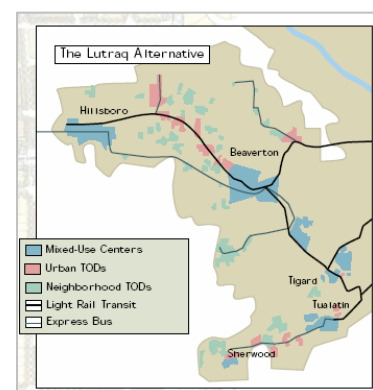
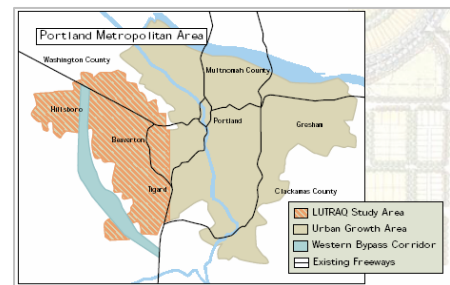
Five scenarios were developed and tested as part of the project:

No Build: assumes current land use plans and trends and no major transportation improvements beyond currently approved and funded projects.

Highways Only: assumes the construction of the Western Bypass and continuation of trend land use patterns.

Highways/Parking Pricing: assumes the same conditions as Highways Only, plus a demand management package including parking pricing for work trips and transit pass subsidies.

LUTRAQ: assumes a transit-oriented land use pattern, extension of the regional transit system (rail & bus), limited arterial expansions, and the parking pricing/transit subsidy package.



LUTRAQ/Congestion Pricing: assumes the same conditions as LUTRAQ, plus a congestion road pricing system.

The evaluation process

The analysis assessed impacts of the scenarios on various transportation measures, vehicle emissions, energy consumption, and greenhouse gas emissions.

The project relied primarily on the travel demand/vehicle emissions modeling system maintained by Metro, Portland's MPO. As part of the project, a series of improvements were made to that modeling system to improve its predictive capacities in areas related to land use design and mix. The project staff began work on an interactive land use/transportation modeling system, but did not complete this part of the project.

Evaluation results

The LUTRAQ/Congestion Pricing scenario had the least environmental and transportation impacts and the lowest congestion levels of all the scenarios. LUTRAQ (without congestion pricing) had notably lower levels of auto usage than the two highway scenarios, and lower congestion levels than the Highways Only scenario.

Scenarios	Daily VMT	Vehicle Trips/ Household	Peak Hours Delay	Home-Based Work Trips			
				% Auto	% Carpool	% Transit	% Walk/Bike
No Build	6,883,955	7.53	2,930	75.8	14	7.5	2.8
Highways Only	6,995,986	7.5	1,670	75.1	13.6	8.8	2.5
Highways/ Parking Pricing	6,856,447	7.29	1,210	61.7	20.4	15.3	2.5
LUTRAQ	6,442,348	7.17	1,370	57.5	19.9	18	4.6
LUTRAQ/ Congestion Pricing	5,976,191	7.07	1,000	54.6	19.4	20.8	5.1

Elected official participation/public involvement

The project was directed by policy and technical advisory committees that included representatives from local and regional business organizations, citizen groups, and governments. The project sponsor worked with an allied nonprofit organization to develop and produce a series of public meetings and workshops in support of the project. The Oregon

Department of Transportation specified the No Build and highways scenarios through the agency's environmental review process on the Western Bypass, which included advisory committees of citizens and stakeholders.

Resulting actions

The Oregon Department of Transportation included the LUTRAQ scenario as one of five alternatives that it analyzed in a Major Investment Study on the Western Bypass. At the conclusion of that study process, regional decision-makers effectively selected the LUTRAQ scenario as the preferred option. The scenario was incorporated into Metro's Region 2040 Growth Strategy and adopted as part of the region's land use/transportation plan.

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Salem Futures

Sponsor: City of Salem, Oregon

Completion Date: 2000 **Planning Horizon:** 2050

Source: Project Website:
<http://www.cityofsalem.net/~futures/>
 Evaluation Criteria Memo;
 Phase I Report: Alternatives;
 Evaluation Results Memo



The study was motivated, in part, by rapid growth during the 1990s. The project's aims were to reduce reliance on the automobile, save farmland, and revitalize neighborhoods.

The nature of the scenarios

The project developed a base case and three initial scenarios:

Base Case: reflects existing plans and current trends

The initial scenarios were crafted through the public meetings process, but were not, apparently, analyzed quantitatively:

Alternative 1 – Corridors: directs much of the future growth into compact, mixed-use developments along existing transportation corridors

Alternative 2 – Centers: accommodates most of future growth in existing regional centers

Alternative 3 – Dispersed Growth: provides some infill/redevelopment, but mostly focuses growth into moderate density developments at the region's fringe



After a series of public meetings and workshops, two draft preferred scenarios were crafted and tested:

Draft Preferred Alternative 1A: based on current land use policies, the scenario provides more protection of environmentally sensitive lands inside the UGB, higher average housing and employment densities, and more infill and redevelopment than the Base Case.

Draft Preferred Alternative 1B: assumes the same conditions as 1A, with even higher residential densities.

After further analysis, a final scenario was drafted:

Preferred Alternative: based on Draft 1B, assumes higher densities within the large-lot residential development types, a higher level of redevelopment, and more concentrated mixed used development in transit corridors.

The evaluation process

The study utilized 14 criteria, grouped into five headings:

Transportation

Hours of delay per capita; mode choice split; people (residents, employees) per acre within 1/4 mile of current transit stops; mix of residential and non- residential land uses by major sub-region

Environment

Acres of future development on land zoned farm or forest land outside UGB; number of acres of future development in environmentally sensitive areas (floodplain, steep slopes, wetlands); amount of impervious area

Economy

Percent of future development on redevelopment and infill land; percent of all new dwelling units and employees on redevelopment and infill lands; total acres needed to accommodate new growth; percent of dwelling units within 1/4 mile of retail uses

Neighborhoods

Ratio of residential land demand to capacity (supply) for attached and detached dwelling units; park ratios

Community

Infrastructure cost per capita

The project relied, in part, on the use of the PLACE³S and EMME/2 software packages.

Evaluation results

Of the four scenarios that were fully analyzed, the Preferred Alternative consumed the least land, had the most redeveloped land, mixed use development, and the most transit accessible development pattern. Mode choice figures were fairly constant across scenarios.

Scenarios	Single/Multi-Family Dwellings	Dwellings /Acre	% Auto	% Carpool	% Transit	% Walk/Bike
Base Case	65 : 35	5.3	45	44.8	1.8	8.5
Draft Preferred Alternative 1A	63 : 37	7.7	45.1	44.2	2	8.8
Draft Preferred Alternative 1B	56 : 44	9.12	44.3	44	2.1	9.6
Preferred Alternative	50 : 50	10.8	88.5		2.1	9.4

Elected official participation/public involvement

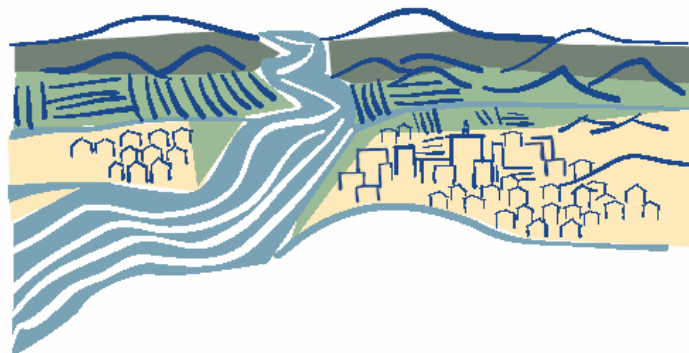
The study team first created the trend scenario and assessed its likely impacts on quality of life, and then used that information as the basis for a series of public workshops. Workshop participants helped develop a vision statement for the project, and used the PLACE3S software package to draft a series of alternative scenarios. These workshop scenarios were condensed into Alternatives 1-3 for more rigorous analysis. Additional public meetings led to the creation of the two draft preferred scenarios, and the final preferred scenario.

Resulting actions

The Salem City Council adopted the project vision statement and the Preferred Alternative in spring 2002. The council adopted a series of measures designed to implement the Preferred Alternative as part of the periodic review of its comprehensive plan required under Oregon land use law. The adoption also was intended to bring the city into further compliance with the Oregon Transportation Planning Rule.

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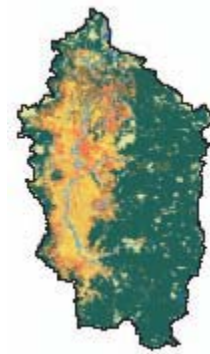
Oregon

Willamette Basin Alternative Futures Analysis

Sponsor: Pacific Northwest Ecosystem Research Consortium

Completion Date: 2002 **Planning Horizon:** 2050

Source: Project Website:
http://www.fsl.orst.edu/pnwerc/wrb/Atlas_web_compressed/PDFtoc.html



This project was undertaken by a group of researchers at Oregon State University to provide “an environmental assessment ... for helping communities make decisions about land and water use.” The valley is only 12% of the Oregon land area, but accounts for 31% of the state’s timber harvests and 45% of the market value of its agricultural products, while playing host to 68% of the state’s population. The project was motivated, in part, by concerns about potential conflicts between these different land uses in the face of anticipated high levels of future population and economic growth.

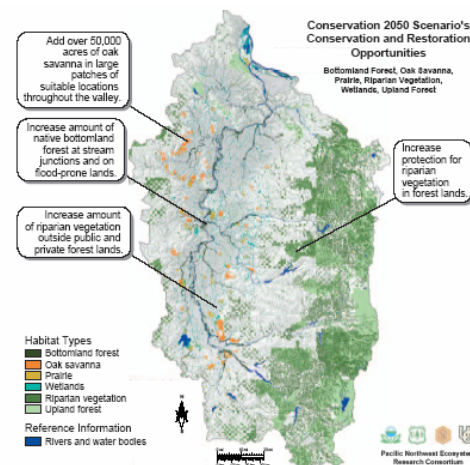
The nature of the scenarios

In addition to creating maps of current and historical landscape conditions, the project produced three future scenarios for the year 2050:

Plan Trend: assumes current policies are implemented as intended and current trends continue, resulting in a development pattern utilizing only lands within urban growth boundaries and rural residential areas.

Development: reflects a loosening of current policies, allowing for a less constrained and more dispersed development pattern to emerge.

Conservation: places a greater emphasis on protecting and restoring various ecosystems in the valley by directing growth into less sensitive areas using a less consumptive pattern.



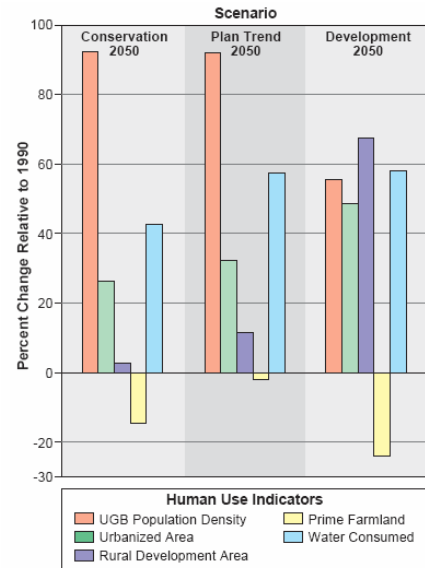
The evaluation process

The scenarios were compared for their relative impacts on wildlife habitat, water availability, stream conditions, and the ecologic health of the Willamette River.

The project began by employing satellite imagery to map the valley's current conditions and classify its land use/land cover into 64 categories. Another early step was to use historic records and survey data to construct a map showing the likely landscape of the valley before the influx of European settlers in the mid-19th century.

Evaluation results

Interestingly, the Plan Trend would save more farmland than the other two scenarios (including Conservation). This perhaps reflects Conservation's ecosystem/habitat focus, which presumably would take some farmland out of production. The Conservation and Plan Trend scenarios would result in about the same mix of urban/rural growth; the Development scenario would result in much more rural development. Water consumption levels would be about the same between Development and Plan Trend, less for Conservation.



Elected official participation/public involvement

Input into the scenario development process came from the Willamette Valley Livability Forum, a governor appointed body of business representatives and elected and appointed officials from local, regional, and state governments.

Resulting actions

The extensive GIS data layers created by this project were used by two other scenario planning projects in the Willamette Valley—the Willamette Valley Livability Forum and the Willamette Valley Livability Futures Project.

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Oregon

Willamette Valley Alternative Futures Project



Sponsor: 1000 Friends of Oregon

Completion Date: 2001 **Planning Horizon:** 2050

Source: Willamette Valley Alternative Futures Project -- Summary Report (Dec 2000)

The project sought to determine the long-range consequences of development in the Willamette Valley on farm and forest lands, and on the cost of urban services. The project was inspired, in part, by a study of the valley completed in the early 1970s by Lawrence Halprin. It was also influenced by the American Farmland Trust's study of California's Central Valley (*Alternatives for Future Urban Growth in California's Central Valley*).

The nature of the scenarios

The study posed two scenarios:

Historic Trend: assumes a continuation of recent development trends, absent major shifts in market trends or public policy.

Compact: assumes development is located primarily inside urban growth boundaries and on lands already zoned for non-resource purposes.

The evaluation process

The study assessed the scenarios' relative impacts on farmlands, forest lands, and costs for public infrastructure and services.

The study team used GIS data from the Willamette Basin Alternative Futures Analysis to create the two scenarios for this project.

Evaluation results

The analysis showed that the Historic Trend scenario will consume twice as much farmland, more than twice as much forest land, and cost over \$2 billion more in public infrastructure/services capital and operating costs than the Compact scenario.

Scenarios	Single/Multi-Family Dwellings	Dwellings/Acre	Farmland Acres Converted	Sewer, Water, Roads Capital Costs
Historical Trend Alternative	61 : 39	7.0	300,000	\$15,237,000,000
Land-Conserving Alternative	53 : 47	8.6	150,000	\$14,228,000,000

Elected official participation/public involvement

The study was directed by a steering committee consisting of representatives from the farm, forest, and homebuilding industries; local governments; and environmental organizations. Aside from this group, it appears that no other official or public involvement occurred.

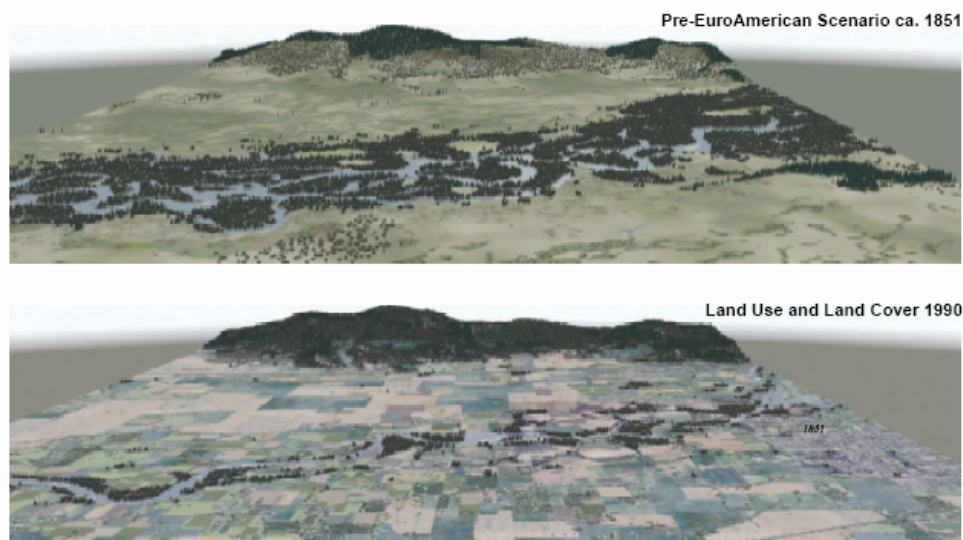
Resulting actions

The analysis was intended primarily to generate information to be used in educating local and state decision makers on growth issues. No specific follow-on activities or institutional changes are evident.

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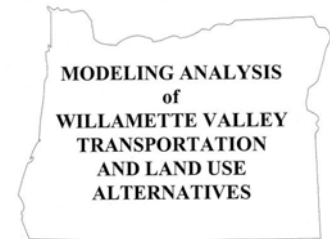
Oregon

Willamette Valley Livability Forum, Alternative Transportation Futures Project

Sponsor: Oregon Department of Transportation

Completion Date: 2001 **Planning Horizon:** 2050

Source: Modeling Analysis of Willamette Valley Transportation and Land Use Alternatives (June 2001)



Population in the Willamette Valley is expected to double between 1990 and 2050. This project was undertaken in reaction to that growth projection and to “facilitate and coordinate a long-range, comprehensive, regional look at the future of land use and transportation” in the region.

The nature of the scenarios

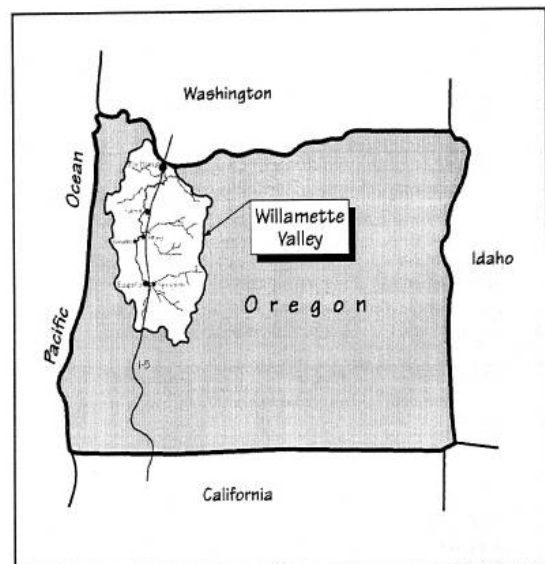
The project studied eight scenarios. The first five were chosen to test the responsiveness of land use and transportation patterns to a variety of possible policy packages. The remaining three scenarios blended various features from the first five. All eight assume the same overall levels of economic and population growth.

No Action: assumes no major improvements in transportation systems and a land development pattern based on historic trends.

Highway Emphasis: assumes major expansion of highway systems in the region, no major transit improvements, and historic trend land use patterns.

Transit Emphasis: assumes major expansions of transit systems, no major highway expansions, and trend land use patterns.

Mileage Tax Emphasis: includes a major new mileage-based road tax (@ \$0.20/mile), no major transportation expansions, and trend land use patterns.



Compact Development Emphasis: assumes a development pattern with growth clustered concentrically around existing urban growth boundaries, but no major transportation improvements.

Hybrid 1: assumes only rural improvements to the highway network, major improvements in transit systems, a moderate graduated road mile tax (\$0.10 to 0.20), and growth clustered next to existing urban growth boundaries.

Hybrid 2: assumes moderate improvements to both urban and rural highway systems, moderate improvements to transit systems, a lower level graduated road mile tax (\$0.05 to 0.10), and the clustered land use pattern.

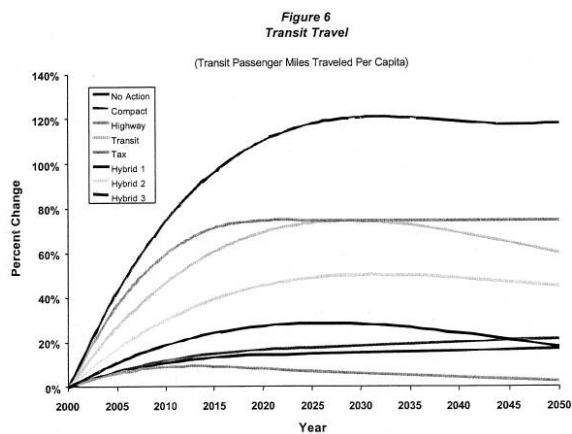
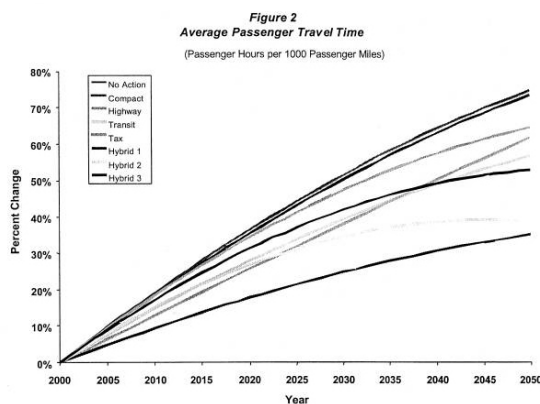
Hybrid 3: assumes moderate improvements to the highway and transit systems, no road tax, and the trend land use pattern.

The evaluation process

To assess the scenarios, the study focused on the distribution of jobs and households, vehicle miles traveled per person, vehicle travel times and speeds, vehicle emissions, and real estate prices.

To create the scenarios, the study team used GIS data from the Willamette Basin Alternative Futures Analysis. To assess the scenarios' relative impacts, the project's sponsor (Oregon Dept. of Transportation) developed an in-house integrated land use-transportation forecasting model. The model operates at a state-wide level and integrates economic, land use patterns, and travel patterns.

Evaluation results



The scenarios show significant impacts on the distribution of households only in the mid-valley portions of the region, and in non-valley portions of the state—north valley, south valley, and Clark County, Washington show very little change across scenarios. The distribution of jobs is, again, fairly static in the north and south valley areas, but dynamic in other parts of the state. The measurement of VMT per person curiously shows travel declining from current rates for all scenarios. This perhaps is due in part to the model's focus on inter-zonal travel in a system with geographically large zones (some zones cover entire cities). The Hybrid 1 scenario demonstrated the lowest level of VMT/person, with Transit Emphasis showing the second lowest. The Mileage Tax scenario posted numbers similar to the Compact Development scenario.

Elected official participation/public involvement

The project was directed by the Livability Forum, a voluntary association of local, regional, and state governments, and business and citizen groups in the Willamette Valley. Representatives to the Forum included elected officials, business persons, agency staff, and employees of area nonprofit organizations. Apart from this group, there is no indication of other official or public involvement.

Resulting actions

The Willamette Valley Livability Forum was not intended to create a new institutional capacity on land use/transportation issues, but to provide detailed technical information on those issues so that “project partners will be able to make recommendations to federal, state, and local government, as well as to leaders of business, industry, and non-profit organizations in the Valley.”

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Marion County Urban Growth Management Project

Sponsor: Marion County, Oregon

Completion Date: 2002 **Planning Horizon:** 2050

Source: Marion County Urban Growth Management Project, Phase I and II Report
<http://publicworks.co.marion.or.us/Planning/ugm.asp>



The project was undertaken to assess growth impacts over a 50 year period, and to develop a preferred alternative for managing growth and necessary implementation strategies.

The nature of the scenarios

The project used five scenarios:

Base Case: extends current conditions and trends through the study period.

Alternative A: maintains current urban growth boundaries, and allocates growth according to available land within those boundaries.

Alternative B: allocates the majority of growth into cities along the I-5 corridor.

Alternative C: allocates the majority of growth to the three next largest cities in the county, after Salem/Keizer.

Preferred Alternative: based on Alternative C; crafted by elected officials and other stakeholders.

The evaluation process

The scenarios were evaluated for their relative impacts on transportation, land use, and environmental values.

Evaluation results

Alternative B was nearly as land consumptive as the base case; Alternative A was the most dense, and hence, least consumptive. The results from the evaluations of transportation and environmental measures were not reported.

Evaluation of Alternatives				
Evaluation Criteria	Base Case	Alternative A	Alternative B	Alternative C
1. Land area for new development	8,767 acres	5,932 acres	8,567 acres	6,418 acres
2. Acres of UGB expansion	3,775 acres	251 acres	3,610 acres	2,111 acres
3. Acres of new development in existing UGBs	4,992 acres	5,681 acres	4,957 acres	4,307 acres
4. Acres of farm or forest land (zoned EFU) that would be developed for urban uses	3,762 acres	689 acres	3,216 acres	1,209 acres
5. Amount of impervious surface area for new development	37 percent (3,249 acres)	49 percent (2,893 acres)	39 percent (3,370 acres)	46 percent (2,275 acres)

Elected official participation/public involvement

The project sought public input at various stages and in a variety of forms. Included were focus groups, opinion surveys, newsletters, a website, a stakeholder group, a technical advisory committee, and a series of workshops. The objectives of these efforts included assessing community values, developing scenarios, and crafting a preferred alternative.

Resulting actions

A steering committee consisting of local elected officials was drawn from the project stakeholders group to make final decisions on the preferred alternative. The committee crafted a scenario based on Alternative C, which then provided the basis for a growth framework element that the county then adopted as part of its comprehensive plan.

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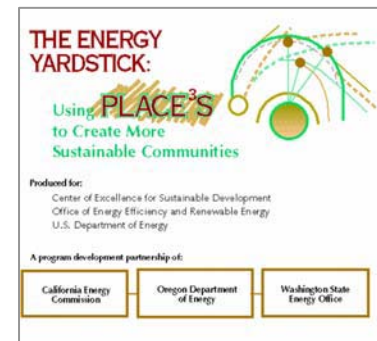
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River District Alternative Futures

Sponsor: City of Portland; Oregon Department of Energy

Completion Date: 1995 **Planning Horizon:** 2015

Source: The Energy Yardstick: Using PLACE³S to Create More Sustainable Communities



The study took advantage of an ongoing planning process to test the PLACE³S software at a neighborhood level planning process aimed at the redevelopment of a former manufacturing/warehouse district.

The nature of the scenarios

Three scenarios were used:

Future Base Case: development will occur along typical patterns as they exist in the surrounding areas, guided by exiting zoning and market forces.

Advanced Case: development will be situated to maximize energy efficiencies.

Developers' Case: development will be according to a developer-specified master plan, intended to balance traditional market demand and the city's desire for greater density in the area.

Preferred Case: a compromise between the Advanced and Developers' scenarios.

The study team assumed lower parking ratios for all of the non-Base Case scenarios.

The evaluation process

The study team used a wide variety of land use indices, from the more standard measures of density and acres per land use, to more unusual measures, such as block size. The transportation indices focused on transit accessibility (e.g., dwellings w/i ½ mile of a rail stop), pedestrian infrastructure capacity, and street design. Many of these measures, however, were specified as model inputs. The model outputs were focused on energy consumption and greenhouse gas emissions.

Evaluation results

RIVER DISTRICT ENERGY EFFICIENCY RESULTS				
	Base	Alternative Futures		Preferred
		Advanced	Developer	
Energy use (MMBtu/yr)	851,325	1,936,764	897,193	1,399,848
Embodied energy (MMBtu)	5,300,660	17,581,633	7,243,496	12,505,629
On-site energy production (MMBtu/yr)	4,653	59,167	1,249	51,769
CO emissions (tons/yr)	1,177	2,692	1,151	1,887
CO2 emissions (tons/yr)	85,848	243,420	75,195	171,854
Energy use per resident (MMBtu/yr)	466	175	88	123
Energy use per acre (MMBtu/yr)	4,652	10,583	4,903	7,649
CO emissions per resident (tons/yr)	0.64	0.24	0.11	0.17
CO2 emissions per resident (tons/yr)	47	22	7	15

Elected official participation/public involvement

Only development and governmental stakeholders were involved during the study process. After the study was complete, the city worked with neighborhood organizations to further craft the plans for the area.

Resulting actions

The city subsequently adopted a redevelopment plan for the area that is a mix of the Developers' and the Preferred scenarios.

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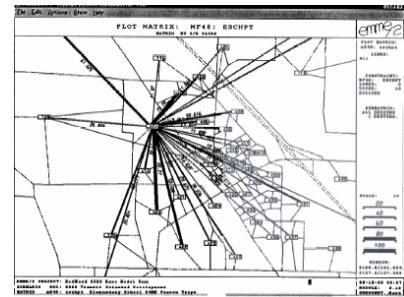
Transit Oriented Design and Transit Corridor Development Strategies Project

Sponsor: Rogue Valley Council of Governments

Completion Date: 1999

Source: Technical Memo #5: Travel Demand Modeling of Land Use Alternatives

[http://www.rvcog.org/pdf/Planning TOD Land Use Tech Memo.pdf](http://www.rvcog.org/pdf/Planning_TOD_Land_Use_Tech_Memo.pdf)



This study assessed land use alternatives as part of an update of the region's long-range transportation plan. The study was intended, in part, to assist the region in complying with provisions of Oregon's Transportation Planning Rule.

The nature of the scenarios

The study developed two land use scenarios, both assuming the same transportation network:

Planned Growth: assumes growth patterns follow existing comprehensive plans.

Transit-Oriented Development: focuses growth in a limited number of compact activity centers.

The evaluation process

The scenarios were assessed, at least initially, for their relative performance on mode split, VMT, and travel. Other analyses are suggested, but not included, in the documentation. Included in this category are analyses that would use the land use patterns in these two scenarios in combination with a variety of transportation improvements, and demand and system management policies.

The primary tool used was the region's travel demand-mobile emission modeling system.

Evaluation results

The scenarios performed almost identically. VMT, for example, varied only 0.2%. Mode split numbers were even closer. Possible explanations for this result include the lack of any transit expansion component in the scenarios—baseline transit service levels were very low.

Purpose	Planned Growth Mode Split			
	Non-Motorized	Transit	Drive Alone	Shared Ride
Home-Based Work	3,478	72	57,564	7,537
Home-Based Non-Work	19,278	625	67,041	104,587
Non-Home Based	7,100	171	45,492	51,911
Total	29,856	868	170,097	164,035
Percentage	0.0818	0.0024	0.4662	0.4496

Purpose	TOD Mode Split			
	Non-Motorized	Transit	Drive Alone	Shared Ride
Home-Based Work	3,435	100	57,648	7,470
Home-Based Non-Work	19,181	655	67,271	104,425
Non-Home Based	7,105	214	45,369	51,885
Total	29,721	969	170,288	163,780
Percentage	0.0815	0.0027	0.4669	0.4490

Land Use	Regional VMT	Mean Travel Time
Planned Growth	3,279,255	10.24 minutes
Transit-Oriented Development	3,272,200	9.87 minutes

Elected official participation/public involvement

It appears that the scenarios were primarily developed by agency staff. The public and elected officials were involved in reviewing the output of the analysis as part of the long-range planning process.

Resulting actions

The agency adopted the Transit-Oriented Development scenario as the preferred option, and incorporated it as the land use element of the region's long-range transportation plan.

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Regional Analysis of What-If Transportation Scenarios

Sponsor: Delaware Valley Regional Planning Commission

Completion Date: 2003 **Planning Horizon:** 2030

Source: Regional Analysis of What-If Transportation Scenarios – Final Report

The DVRPC board directed staff to construct and analyze a series of scenarios that would reflect a broad range of regional, national, and global policy, economic, and environmental changes in preparation for the development of the region's 2030 long-range transportation plan.

The nature of the scenarios

Twelve scenarios were crafted and assessed qualitatively in the project's first phase, leading to the development of five scenarios for subsequent quantitative analysis:

2025 Plan Prevails: based on the current long-range plan, assumes a center-based and planned infill development pattern.

"Green" Urban Center Repopulates: assumes population/employment projections in 2025 Plan scenario, but in a more recentralized spatial pattern using 72% less land.

Sprawl Accelerates: assumes population/employment projections in 2025 Plan scenario, but in a much more dispersed development pattern using 150% as much land.

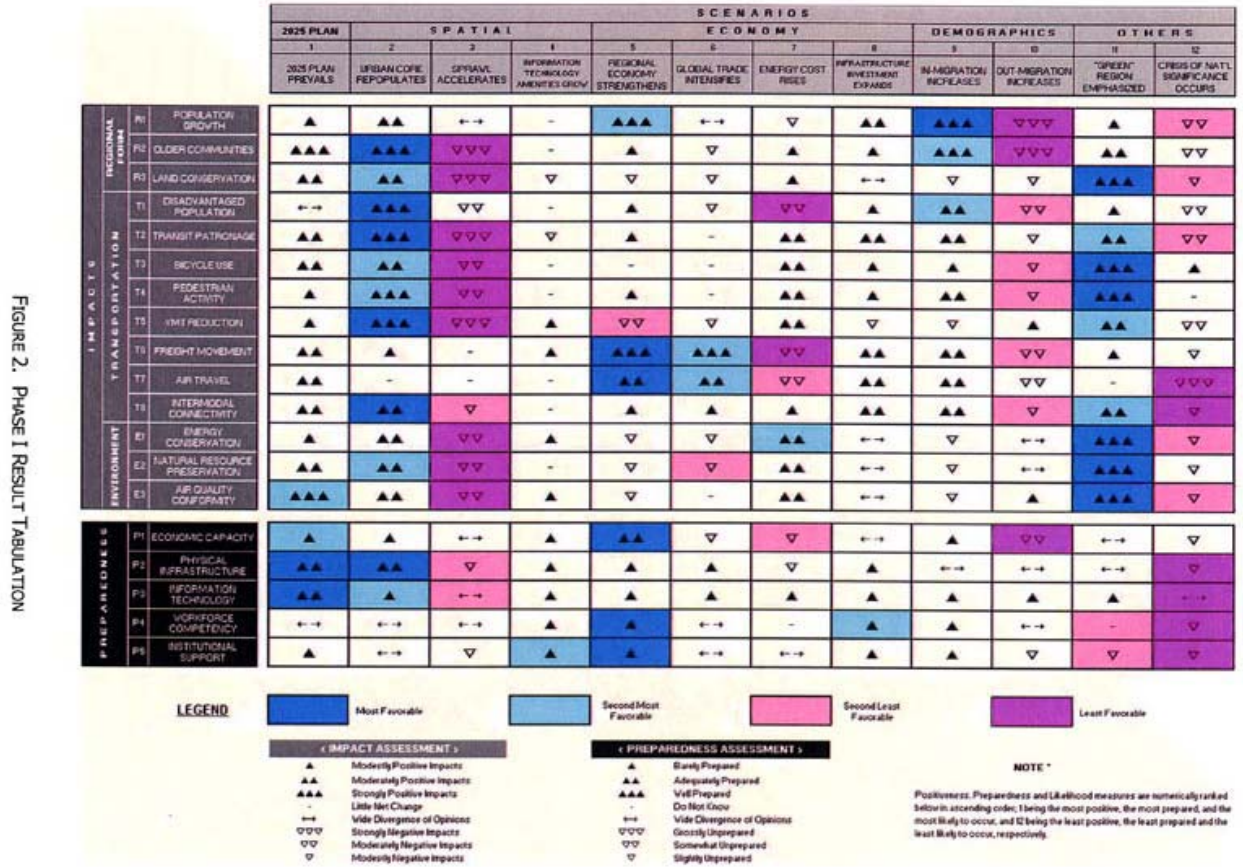
In-Migration Increases: assumes population and employment growth significantly exceeds (by about 10%) the levels assumed in the 2025 Plan scenario.

Out-Migration Increases: assumes population and employment growth is significantly less (by about 10%) than the levels assumed in the 2025 Plan scenario.

The evaluation process

The project staff assessed the initial 12 scenarios qualitatively for their proportional impacts on regional form, transportation, and the environment. The staff also ranked the scenarios according to those with most positive/negative impacts, those most likely/unlikely to occur,

and those that have had impacts that were generally agreed upon/most debated. The staff selected as the five final scenarios those that were most positive, likely to occur, and about which the impacts were most generally agreed upon.



Quantitative analysis of the final scenarios was accomplished using the region's regular travel demand/air emissions models. The analysis tested the scenarios for their impacts on transportation, including the usual measures of VMT, vehicle trips, average peak hour speed, and volume to capacity ratios. It also included an assessment of travel times between major generators/destinations in the region, depicting changes between scenarios graphically. The scenarios were also tested for their impacts on energy consumption and the cost of "supportive infrastructure."

Evaluation results

Given its lower levels of population and employment growth, it was not surprising that the Out-Migration scenario had the lowest impacts on virtually all measures. Among the three scenarios with consistent growth levels, the Urban Center Repopulates scenario had the least impact for all measures except those related to congestion. In some cases, however, the difference was slight: e.g., VMT for the Urban Center scenario was approximately 1% lower

than the 2025 scenario. Interestingly, though the Out-Migration scenario generally outperformed the other scenarios, its numbers were quite close to those for the Urban Center scenario.

Scenario	Urban Area Dwellings/ Acre	Daily VMT	Daily Auto Trips	Highway Volume/ Capacity	Daily Transit Trips
2025 Plan Prevails	7.5	138,963,900	18,200,000	0.58	923,706
Green Urban Center Repopulates	7.9	137,492,300	16,800,000	0.57	1,015,387
Sprawl Accelerates	6.7	141,895,900	18,200,000	0.59	666,016
In-Migration Increases	6.9	142,088,700	18,900,000	0.59	928,919
Out-Migration Increases	6.3	137,448,200	16,700,000	0.57	765,961

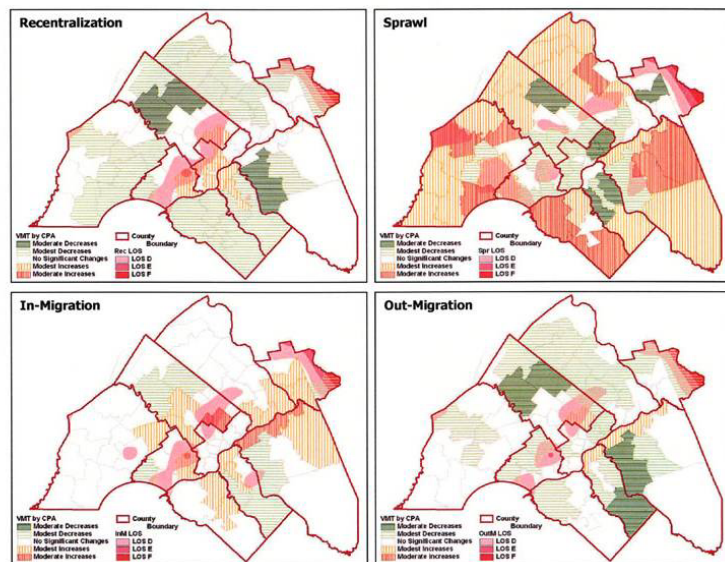
Elected official participation/public involvement

The project was generally run by agency staff, with input from an agency policy advisory committee.

Resulting actions

The results of this study were to be used as “the planning foundation for the 2030 Long-range [transportation] Plan.” The staff’s conclusion at the end of the analysis, however, was that the current 2025 plan “is an excellent plan overall,” and that the 2030 plan should therefore merely extend the features already in place.

FIGURE 7. VMT CHANGES BY COUNTY PLANNING AREA (CPA)



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Integrated Infrastructure Planning Project

Sponsor: Catawba Regional Council of Governments

Completion Date: 2003 **Planning Horizon:** 2025

Source: http://www.ors2.state.sc.us/tcsp/pdf/catawba_tcsp.pdf



The Catawba Integrated Infrastructure Planning Project began with Transportation and Community and System Preservation Pilot Program funding that South Carolina Office of Regional Development obtained for a five regional planning process. The objective of the state program was to “assist counties and municipalities with implementing land use regulations, comprehensive plans, and other development related tools that address both the benefits and the costs associated with growth.” A significant part of the project’s analysis focused on the consistency of the three scenarios with various state-wide plans for transportation, water, economic development, energy, and infrastructure.

The nature of the scenarios

The project developed and tested three scenarios:

Trend: assumes continuation of current development trends and patterns, similar to that which has occurred over the previous decade.

Compact Growth: maximizes development within existing urban areas and areas clustered around existing and planned population, commercial, and industrial centers. Population growth is assumed to be 4 percentage points less than Trend.

Expanded Growth: assumes a development pattern similar to the trend scenario except the development trends are maximized.

The evaluation process

The scenarios were measured for their impacts on land use, economic development, capital facilities costs, transportation, air quality, water quality, and energy consumption.

The growth allocation for the Trend scenario was based on interviews with local planners. The other scenarios were crafted with the aid of the “What If” GIS software program. The calculation of energy consumption was based solely on VMT, and hence, did not reflect values

associated with building types and configurations. The transportation model used did not include components effective at measuring the travel impacts of walkable development patterns or alternative travel modes, thereby skewing the transportation figures, especially for the Compact Growth scenario.

Evaluation results

For most of the indices, the range of values between scenarios was very narrow. The only exception was for capital infrastructure costs, where the Expanded Growth scenario was almost twice as expensive as the Compact Growth scenario. Also notable was a counter-intuitive result in the calculation of VMT—the Compact Growth scenario showed a 10 percentage point increase over the Trend scenario, despite having a more condensed development pattern and a lower level of population and employment growth.

<u>CRITERIA</u>	<u>DEVELOPMENT SCENARIO</u>		
	<u>TREND</u>	<u>COMPACT</u>	<u>EXPANDED</u>
Economic Impact of Dev.	3.3 B	3.0 B	3.5 B
Water Infrastructure Costs	\$35.0 M	\$26.8 M	\$45.0 M
Sewer Infrastructure Costs	\$60.0 M	\$48.5 M	\$65.0 M
Transportation Infrastructure Costs	\$396 M	\$268 M	\$550 M
Energy Consumption	52.3 B BTUs	53.5 B BTUs	53.6 B BTUs
Transportation Cost Per Day	\$556,362	\$569,663	\$569,950
VOC Emissions	6.6 tons/day	7.1 tons/day	7.1 tons/day
CO Emissions	108.6 tons/day	114.5 tons/day	115.6 tons/day
NOx Emissions	6.1 tons/day	6.4 tons/day	6.5 tons/day
Water Quality Impacts	Moderate	Moderate	Heavy

Elected official participation/public involvement

Scenarios for the project were developed by COG staff, in consultation with a technical advisory group, which included local elected officials, planners, and chamber of commerce representatives. Agency staff and consultants selected the preferred alternative.

Resulting actions

The participants in the study process selected a somewhat less dense version of the Compact Growth scenario as the preferred scenario. The study concluded with a recommendation for a “regional policy framework,” and a series of guidelines and suggested policies for establishing that framework.

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Planning Implications of Alternate Development Patterns on Infrastructure and Existing Planning Policies

Sponsor: Pee Dee Regional Council of Governments

Completion Date: 2003 **Planning Horizon:** 2025

Source: Planning Implications of Alternate Development Patterns on Infrastructure and Existing Planning Policies—Pee Dee Region of South Carolina:
http://www.ors2.state.sc.us/tcsp/pdf/peedee_tcsp.pdf

This study is also part of the Transportation and Community and System Preservation Pilot Program funded project described in the previous section, and is motivated by similar objectives.

The nature of the scenarios

The study used three scenarios for analysis:

Current Trends: assumes development trends and patterns of the previous 20 years continue in the future.

Dispersed Growth: scatters development, with equal growth rates in urban and rural areas.

Clustered Development: focuses growth in and around existing urban areas, with little allocated to rural areas.

The evaluation process

The three scenarios were assessed for their relative impacts on land use, economic development, water/sewer infrastructure, transportation, energy consumption, and air quality.

Evaluation results

For most of the indices measured, the range of values between scenarios was very narrow. The only exception was for capital infrastructure costs, where the Clustered Development scenario was substantially lower than the other two scenarios. The Clustered Development scenario was lower in VMT, but not by much (less than 2% compared to the Dispersed

scenario). Project staff attributed this to the decision to hold population and employment levels constant across scenarios.

CRITERIA	DEVELOPMENT SCENARIO		
	TREND	SCATTERED	CLUSTERED
Economic Impact of Dev.	\$11 B	\$9.6 B	\$11.5 B
Water Infrastructure Costs	\$80 M	\$102 M	\$90 M
Sewer infrastructure Costs	\$145 M	\$145 M	\$125 M
Transportation Costs	\$400 M	\$475 M	\$350
Energy Consumption	45.4 M BTUs	45.7 M BTUs	44.9 M BTUs
VOC Emissions	5.0 tons/day	5.1 tons/day	5.0 tons/day
CO Emissions	103.4 tons/day	103.8 tons/day	102.3 tons/day
Nox Emissions	5.6 tons/day	5.7 tons/day	5.6 tons/day
Water Quality Impacts	Moderate	Heavy	Moderate

Elected official participation/public involvement

The study was conducted by agency staff, in consultation with local government planners. There is no indication of elected official or public involvement.

Resulting actions

A significant part of the project's analysis focused on the consistency of the three scenarios with various state-wide plans for transportation, water, economic development, energy, and infrastructure, outlining necessary policy alterations to achieve plan-scenario consistency. The project staff convened groups of local planners to review the results and select a preferred alternative. These groups were unanimous in selecting the Clustered Development scenario. The study authors noted that the networking involved in the study was as important as the results, "as no formal interaction currently takes place." The study concludes with a series of general policies and guidelines deemed necessary to implement the preferred scenario.

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Santee-Lynches Regional Infrastructure Plan

Sponsor: Santee-Lynches Regional Council of Governments

Completion Date: 2003 **Planning Horizon:** 2020

Source: Santee-Lynches Regional Infrastructure Plan (June 2003):
http://www.ors2.state.sc.us/tcsp/pdf/SL_plan.pdf

This study is part of the Transportation and Community and System Preservation Pilot Program funded project described in the section on the Integrated Infrastructure Planning Project, above.

The nature of the scenarios

Three scenarios were used in the study:

Trend: assumes growth will occur within existing urbanized areas where public infrastructure and services are available.

Industrial/Commercial Development: assumes that residential development will occur in a manner similar to the Trend, but that industrial and commercial uses will occupy more undeveloped land, especially in highway corridors.

Resort/Residential Development: assumes substantial increases in residential growth on current undeveloped lands, particularly near large bodies of water.

The evaluation process

The three scenarios were assessed for their relative impacts on land use, economic development, water/sewer infrastructure, transportation, energy consumption, and air quality.

Evaluation results

Somewhat surprising was the Trend's status as the most compact of the three scenarios. Given than circumstance, however, it was not surprising that the Trend was the most energy

efficient, had the least impacts on air and water quality, and lowest levels of VMT and carbon dioxide emissions.

Factors	2000 VMT	Trend Scenario	Industrial/ Commercial	Resort/ Residential
Vehicle Miles Traveled for SLRCOG	6,781,071	9,166,360	9,823,803	9,723,495
BTUs per VMT	3,600	3,600	3,600	3,600
Total BTUs	24.4 B	33.0 B	35.4 B	35.04 B
BTUs per Gallon	125,000	125,000	125,000	125,000
Gallons per VMT Per Day	195,295	263,992	282,296	125,000
Cost Per Gallon	\$1.25	\$1.25	\$1.25	\$1.25
Transportation Cost Per Day	\$244,119.00	\$329,990.00	\$353,658.00	\$350,370.00

Elected official participation/public involvement

The study was conducted by agency staff, in consultation with local government staff responsible for planning, administration, and economic development. There is no indication of elected official or public involvement.

Resulting actions

The project's analysis focused on the consistency of the three scenarios with various state-wide plans for transportation, water, economic development, energy, and infrastructure, outlining policy alterations necessary to achieve plan-scenario consistency. An ad hoc committee of local government staff recommended the Trend scenario as the preferred option from the study. The study concluded with a brief outline of general policies and guidelines deemed necessary to implement the preferred scenario.

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Oak Ridge Reservation Land Use Planning Process



Sponsor: Oak Ridge National Laboratory

Completion Date: 2002

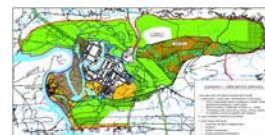
Source: Land Use Technical Report (Sept 2002):
http://landuseplanning.ornl.gov/technical_report/UT-B_Final_Land_Use_Report.pdf

This study was part of a broader planning process at the Oak Ridge National Laboratory looking at the future growth and development of the 34,000 acre reservation. This portion of that effort is focused on a 5000 acre area near the East Tennessee Technology Park.

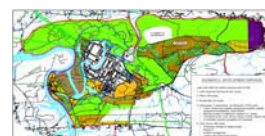
The nature of the scenarios

The study used four scenarios:

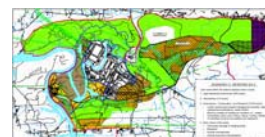
Greenspace Emphasis: allocates about 95% of the study area to greenspace, conservation, and open space, with the balance going to industrial/commercial uses.



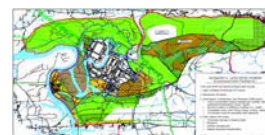
Development Emphasis: allocates about 20% of the study area to industrial and office uses, and incorporates a housing element; the balance would be green or open space.



Modified Parcel ED-3: similar to the Development Emphasis scenario, but with less area allocated to industrial/office uses.



Less Development: similar to Modified Parcel ED-3, but with even less area allocated to development, and none south of the major east-west highway through the study area.



The evaluation process

The scenarios were assessed using an environmental impacts analysis, which included measuring impacts on employment, local government fiscal revenue, land preservation, transportation, and air quality.

Evaluation results

The Greenspace Emphasis scenario had the least impacts on environmental and transportation values, but also lower employment and revenue numbers. Given the varying numbers of residents/employees between the scenarios (fewer with the Greenspace scenario, more with the Development scenario), this is not surprising.

Scenarios	Daily VMT	Reduced Forest Acres	Additional Tons/year		
			CO	NOx	CO2
Greenspace Emphasis	14,000	0	61.2	79.2	5,040
Development Emphasis	34,600	247	151	191	12,600
Modified Parcel ED-3	18,600	172	79	104	6,480
Less Development	15,100	34	65	86	5,400

Elected official participation/public involvement

The study process began with the formation of a focus group, consisting of area residents and individuals with expertise in economic development, environmental and historic values, and community needs. The focus group played a lead role in defining the study's four scenarios. A series of subsequent public meetings/open houses were held to gain further public input. The second of these meetings solicited ideas about possible land use concepts for the study area using a "preliminary feedback map" to depict the ideas graphically. The third meeting focused on a preliminary impacts analysis and a visual preference survey.

Resulting actions

The focus group agreed at the outset that the four scenarios were primarily for study, as opposed to decision making, purposes, and that, therefore, there was not likely to be a "preferred" scenario selected at the end of the process. Nevertheless, the group achieved agreement on the use of approximately 87% of land included in the study area. Based on that consensus, the group recommended that the lab establish mechanisms to provide permanent protection for the lands designated as greenspace in all the scenarios, and that the process used in this study be followed in planning efforts for the rest of the Oak Ridge Reservation.

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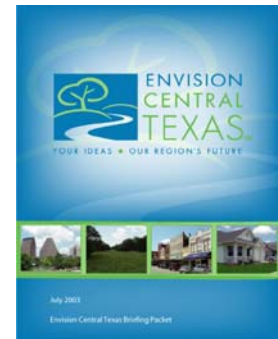
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Envision Central Texas

Sponsor: Envision Central Texas

Completion Date: 2003 **Planning Horizon:** 2020-40 (1.25 million increase in population)

Source: Envision Central Texas Briefing Packet (July 2003)
<http://www.envisioncentraltexas.org/resources.php>
 Scenario Summaries; Appendix V: Indicator Matrix:

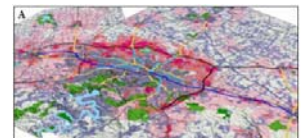


Concern over possible impacts from anticipated high future growth rates motivated the Envision Central Texas project and the creation of the nonprofit organization to oversee it.

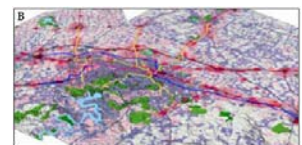
The nature of the scenarios

The project used four scenarios:

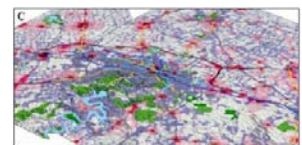
Scenario A: extrapolates recent land development and economic trends and projects them into the future, with most development occurring on greenfield sites and most housing as single-family detached.



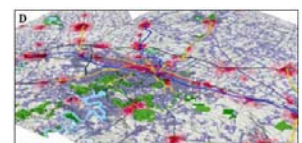
Scenario B: allocates much of the new growth into transportation corridors, with a significant amount occurring in mix-used development patterns.



Scenario C: shares growth between existing urbanized areas in the region and new “satellite” communities located along transportation corridors and separated by greenspace from current developed areas.



Scenario D: focuses new growth in existing developed areas, which would accommodate 1/3 of anticipated new households and 2/3 of new jobs.



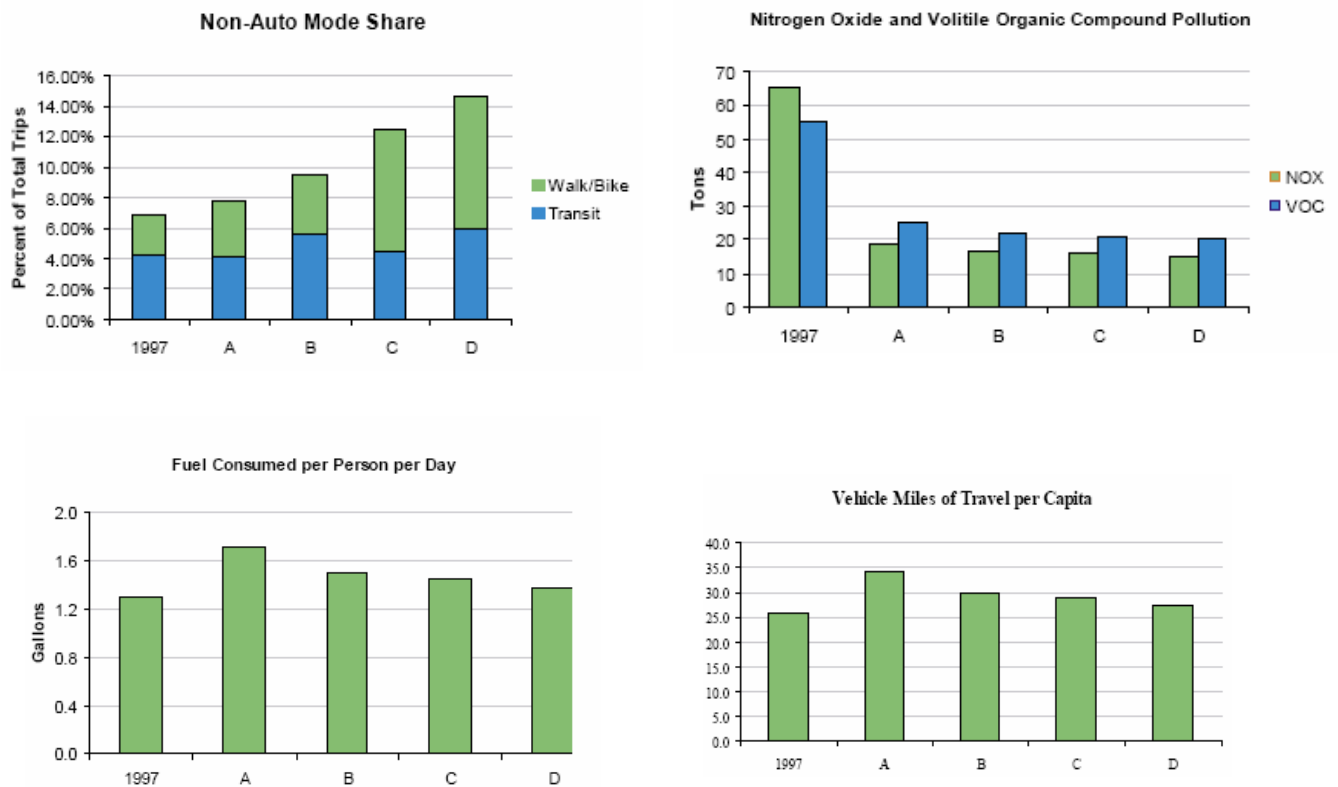
The evaluation process

The scenarios were evaluated for their impacts on local economic conditions, the environment, land use, social equity, housing, and transportation.

A number of tools were used throughout the process. The scenarios were created with the aid of GIS software. The transportation/air quality impacts were determined using the region's regular travel and air quality models.

Evaluation results

As the densest option, Scenario D naturally was less land consumptive. It also had the lowest level of transportation and environmental impacts.



Elected official participation/public involvement

The project began with a public opinion survey designed to elicit attitudes about planning, growth, and community. A series of public workshops were held subsequently at which participants worked in groups to design a future development pattern that would accommodate anticipated future growth. The output from these workshops was used to craft the four scenarios used in the study analysis. The results from that analysis were then used in an extensive outreach campaign to educate the public on the process and the trade-offs represented in the scenarios, and to get public feedback on scenario preferences. A survey completed by more than 12,000 residents indicated a clear preference for scenario D on issues of land use, farmland preservation, and transportation. On protection of the region's primary aquifer and on housing affordability questions, respondents preferred scenario C, somewhat over D.

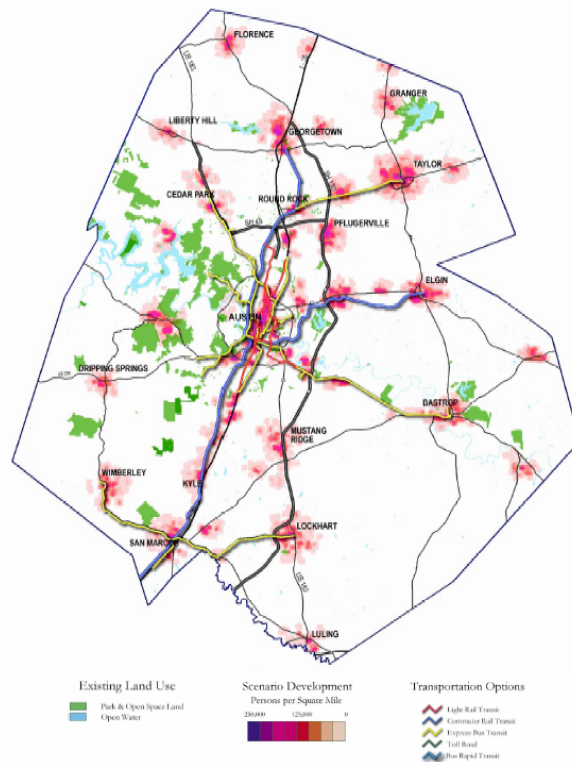
Resulting actions

After receiving input in various forms on the four scenarios, the project sponsors developed a "vision" document, outlining basic, but unspecific, principles they hope will guide growth in the region.

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SCENARIO D



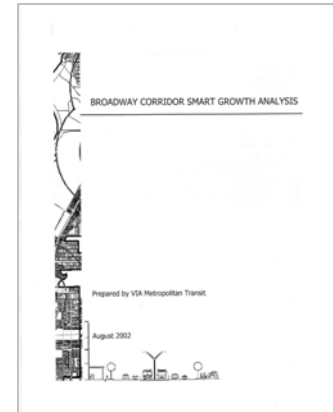
Texas

Broadway Corridor Smart Growth Analysis

Sponsor: VIA Metropolitan Transit (San Antonio, TX)

Completion Date: 2002

Source: Broadway Corridor Smart Growth Analysis Report



The project was initiated to provide a case study of how land use and transportation could be interactively planned in San Antonio. An additional motivation was to identify ways to use the city's new zoning code (UDC) to make the Broadway corridor more pedestrian friendly. "The Broadway corridor was chosen because it is an area in need of economic revitalization, has extra road capacity, a potential for high-capacity transit, and is an ideal setting in which to apply the UDC concepts."

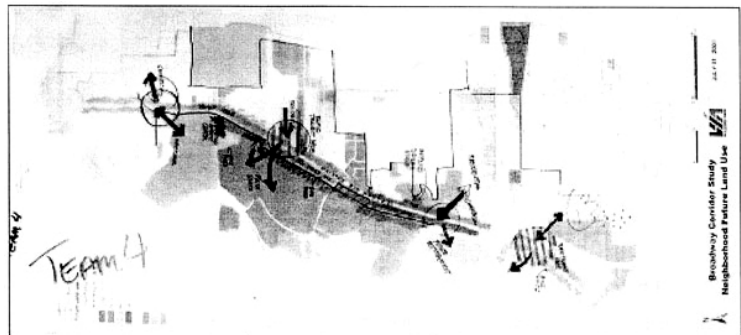
The nature of the scenarios

From a pool of eight initial scenarios, three were chosen to go forward into an analysis phase:

Existing Conditions: extrapolates future land uses from conditions as they now exist in the study corridor.

CoSA: assumes land development according to the city's current general plan.

Scheme 4: assumes growth focused into transit-oriented developments along the presumed route for future high-capacity transit.



The evaluation process

The scenarios were assessed for their impacts on land use, housing, employment, recreation, transportation, and several environmental values. The study used EPA's Smart Growth INDEX GIS model.

Evaluation results

Scheme 4 outperformed the other two scenarios in achieving the smart growth goals established at the beginning of the process.

Scenarios	Single/Multi-Family Dwellings	Employees/Acre	Daily Miles/Person	Dwellings/Acre w/i 1/4 Mile of Transit
Existing Conditions	43 : 57	17.97	19	8.41
CoSA	26: 74	21.31	18.54	9.69
Scheme 4	17 : 83	36.98	17.92	13.1

Elected official participation/public involvement

The project began with a neighborhood charrette process at which stakeholders and residents of the corridor helped define alternative development scenarios. Participants then selected one scenario to go forward for analysis with two other, staff-created scenarios.

Resulting actions

The study was intended primarily for the purpose understanding land use and transportation interactions in a specific location, not to result in any specific policy or institutional changes. A variety of recommendations were included in the project documentation for further study.

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Texas

Urban Form/Transportation System Options for the Future

Sponsor: North Central Texas Council of Governments

Completion Date: 1992 **Planning Horizon:** 2010

Source: DeCorla-Souza, Patrick, "The Impacts of Alternative Urban Development Patterns on Highway System Performance,"
<http://tmip.fhwa.dot.gov/clearinghouse/docs/landuse/ufti/ch2.stm>

This report was part of a four-city effort sponsored by FHWA in the early 1990s to assess the general concepts behind the transportation impacts of alternative land use patterns. In this study, agency staff at the Dallas MPO analyzed the relative impacts of locating housing in proximity to jobs, jobs and housing in areas with under-utilized road capacity, and jobs and housing with access to the light rail system.

The nature of the scenarios

The study utilized four scenarios:

Base Case: the official jobs/housing forecast.

Activity Centers Scenario: focuses job growth in existing activity centers, and housing growth within specified proximity to those centers.

Dispersed Scenario: disperses housing and job growth to areas with under-utilized roads.

Transit Scenario: concentrates jobs and housing growth to areas with direct access to the region's rail system.

Evaluation results

Scenarios	% Change from Base Scenario			
	VMT	Vehicle Trips	Peak Hour Speed	% of Roads Congested
Activity Centers	0%	-1%	-2%	0%
Dispersed	-5%	1%	2%	-10%
Transit	0%	1%	3%	2%

Envision Utah

Sponsor: Coalition for Utah's Future

Completion Date: 2020 **Planning Horizon:** 1999

Source: The History of Envision Utah
<http://www.envisionutah.org/>
 QGET, Scenario Analysis: Executive Summary
 QGET, Strategy Analysis (May 2000)



Envision Utah was motivated by concern over possible quality of life impacts from high population and employment growth rates in the 1980s and 90s. Projections showed a near tripling of the Salt Lake region's population by 2020. The Envision Utah project was inspired and supported by a series of high-profile meetings and conferences on growth in the mid-90s, some of which were hosted by the state's governor.

The nature of the scenarios

The project began with a series of four scenarios. A fifth, compromise scenario was added at the end of the project.

Scenario A: shows how the region might develop if development trends from the previous three to five years continued in the future. This scenario is less dense than current planning/zoning would indicate.

Scenario B: assumes growth will follow existing planning and zoning. This scenario serves as the project's baseline.

Scenario C: accommodates new growth by focusing a significant percentage in existing urbanized areas as infill/redevelopment. New growth areas are designed on walkable community development types.

Scenario D: significantly increases regional densities by assuming large amounts of infill/redevelopment concentrated in rail transit corridors.



Quality Growth Scenario: a compromise scenario blending elements from scenarios C and D.

The evaluation process

The scenarios were evaluated for their relative impacts on transportation, land consumption, water use, air quality, and fiscal costs.

The travel data were derived using the region's regular travel demand model, a forecasting system whose "ability to predict the full range of responses to alternative land use and transportation scenarios is limited."

Evaluation results

Scenario D had the lowest values for land consumption, vehicle travel, and water consumption, about the same fiscal costs as Scenario C, and about the same emissions of air pollutants as scenarios B and C. Though Scenario D substantially increased the percentage of population within ½ mile of rail transit (32%, compared to Scenario A's 1.5%), it showed increases in transit mode share for work trips of only 65% over Scenario A (4.8% and 2.9%, respectively). It is possible this was due, in part, to the large area included in the assessment (including many rural areas) and the travel model's limitations in analyzing alternative development patterns.

Scenarios	Persons/ Residential Acre	Daily VMT	% Transit Work Trips	% Pop. 1/2 mi. of Rail Transit	Acre-Feet Water Consumed	Infrastructure Capital Costs
A	5.0	85,300,000	2.9	1.5	1,025,900	\$37,600,000,000
B	5.6	79,200,000	3.2	1.7	954,200	\$29,800,000,000
C	7.6	76,600,000	4.2	25	808,600	\$22,100,000,000
D	8.2	76,000,000	4.8	32	770,500	\$23,100,000,000
Quality Growth	7.6	76,800,000	5	22.6	915,600	\$21,932,000,000

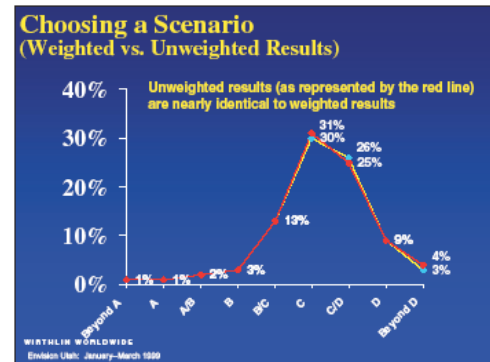
Elected official participation/public involvement

The project began with an interview/survey assessing what residents value about living in the region. The scenarios were created through two series of workshops: the first focusing on where growth should occur, the second on how. Invitations to the workshops were targeted to regional stakeholders, including every mayor and city planner in the region. Versions of these workshops were repeated for a broader range of citizen input. The output of the scenario analysis served as the basis for a significant public education initiative, including

television and radio ads, various newspaper stories, and more than 50 public meetings. The effort culminated with a ballot inserted in the region's Sunday newspapers, allowing citizens to vote on their preferred scenario.

Resulting actions

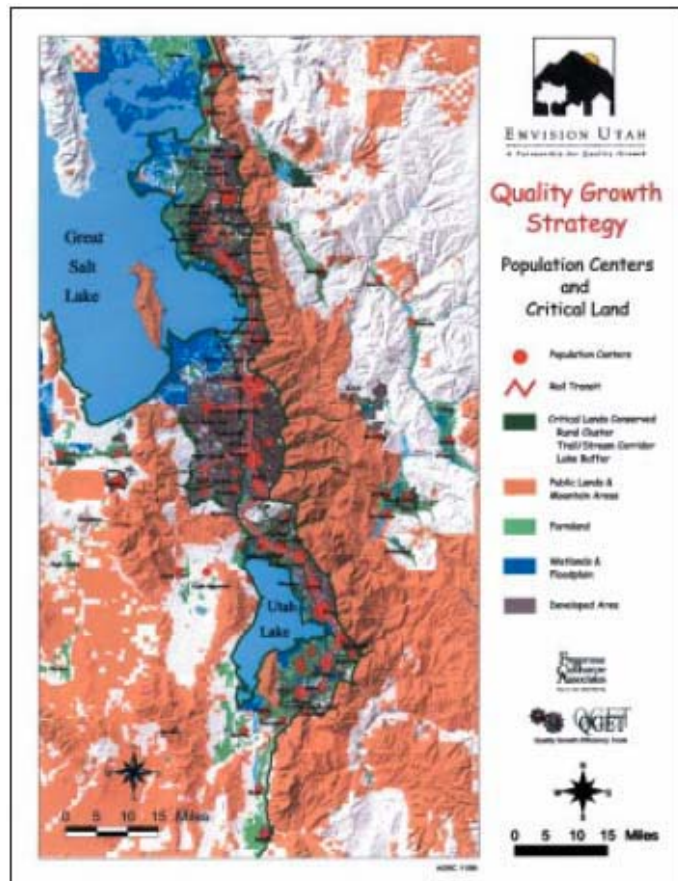
The work conducted by Envision Utah created a constituency for managing growth in the region. In 1999, the state legislature created the Utah Quality Growth Commission to set growth management goals for the state, and to provide a series of financial incentives for local governments to promote "quality growth." Implementation of that system began in 2004.



Graph demonstrating support levels for each scenario.

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Utah

Mountain View Corridor Growth Choices Study

Sponsor: Coalition for Utah's Future; Utah Department of Transportation



Completion Date: 2004 **Planning Horizon:** 2030

Source: Envision Utah, Mountain View Corridor Growth Choices Process: Helping Solve Our Communities' Transportation Problems (2004)

The Mountain View Corridor Project was initiated to develop a series of integrated land use and transportation scenarios for a transportation corridor in the western portion of the Salt Lake City region. The study was part of the scoping process for an environmental impact statement for the corridor.

The nature of the scenarios

Three scenarios were developed and analyzed initially. A fourth, composite scenario was created subsequently, and adopted as the preferred alternative:

Trend: assumes continuation of current land use trends and implementation of existing transportation plans (a freeway through the corridor).

Expansive: assumes growth more dispersed, and at densities lower, than the Trend, and a highway corridor in addition to the freeway contained in the Trend.

Compact: focuses growth in compact communities at nodes along a new bus rapid transit facility.

Vision: a composite scenario blending the land use from the Compact scenario with the highway components from the Expansive scenario; substitutes a streetcar for the BRT and includes additional high capacity transit connections.



The evaluation process

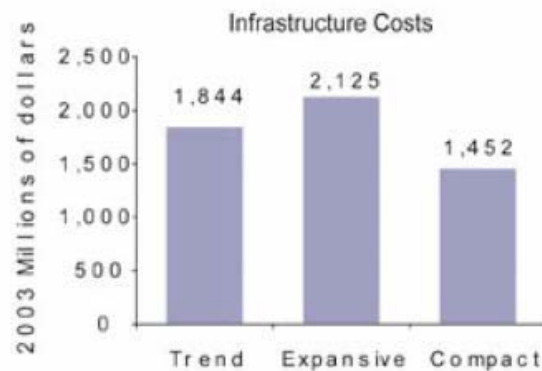
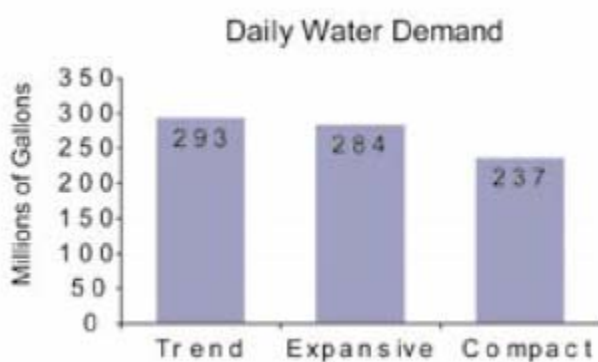
The scenarios were assessed for their impacts on transportation, land use, and water consumption.

GIS was used to translate the charrette results into maps that formed the basis of the scenarios. Transportation impacts were calculated using the region's regular travel demand model.

Evaluation results

The Compact scenario was the least consumptive of land and water, and the least auto dependent. It also had the lowest congestion level.

Scenarios	Persons/ Sq.Mi.	Daily VMT	Vehicle Hours Delay	% Walk/ Bike Trips	Acres Urbanized Land
Trend	5,732	15,491,000	79,457	6.1	71,413
Expansive	5,146	15,404,000	62,395	6.3	79,549
Compact	6,546	13,348,000	59,050	7.3	62,535
Vision	6,149	n/a	n/a	n/a	66,571



Elected official participation/public involvement

The project utilized a series of stakeholder charrette-style workshops to guide the development of the scenarios. Further workshops were employed to craft/select a preferred option. Stakeholders in the process included local government elected officials, and representatives from business and interest groups. Similar workshops were held at both stages for general members of the public. Citizen reaction to the initial three scenarios indicated that a plurality (46%) thought the Compact scenario would best serve the transportation needs of the corridor. By almost the same percentage, however, citizens also thought that the Trend scenario would provide the best quality life among the three options.

Resulting actions

Elected officials in the stakeholder group signed a voluntary agreement committing to support the implementation of the components contained in the Vision scenario by working with their respective jurisdictions to make necessary changes in local plans and zoning. The Utah Department of Transportation plans to carry the Vision scenario forward in the EIS process underway for the corridor.

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2025 Chittenden County Metropolitan Transportation Plan

Sponsor: Chittenden County Metropolitan Planning Organization

Completion Date: 2004 **Planning Horizon:** 2025

Source: DRAFT for Public Review – 2025 Chittenden County Metropolitan Transportation Plan (Dec 17, 2004)
http://www.ccmppo.org/MTP/MTP_final_dec2004.pdf



The scenarios analysis in this project was part of an update to the regional long-range transportation plan.

The nature of the scenarios

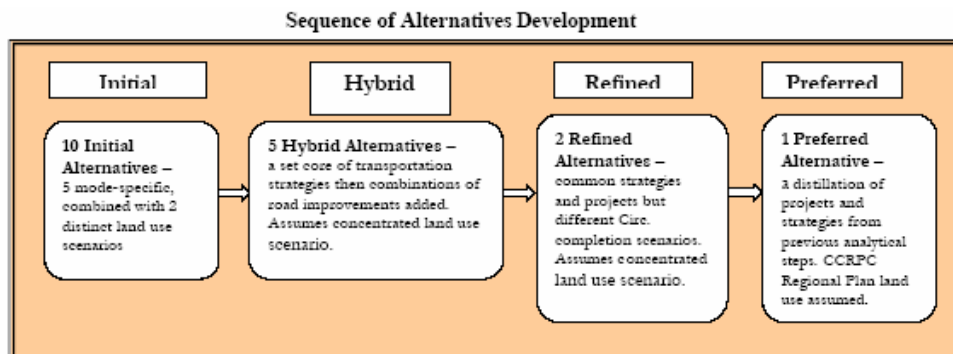
Two land use configurations were crafted for study purposes. These were combined with different transportation investment strategies, resulting in a total of 10 initial alternatives, which were then narrowed to 5 hybrid alternatives, then to two. A final, preferred, scenario was crafted at the end of the analysis. The two land use configurations were:

Trend: assumes decentralized land use patterns following existing patterns of new housing locating throughout the county, and most new jobs locating in the urban and suburban core.

Concentrated: assumes that a significant share of new housing and jobs will locate within designated mixed-use growth centers.

The evaluation process

The scenarios were assessed for their relative impacts on transportation and air quality measures.



Evaluation results

The results from the analysis were presented only in qualitative fashion, indicating that the Concentrated land use pattern out-performed the Trend in almost all transportation combinations. By the time the process narrowed the options down to two alternatives, both incorporated the Concentrated pattern.

**Summary Evaluation of Initial Alternatives
(Concentrated Land Use)**

Mode - Specific Alternative	Performance Measure Category				
	Multi-Modal	Systems Efficiency	Highway System	Air Quality	Cost (millions)
TDM/TSM		⚡		⚡	\$16.5
Transit 1	⚡		⚡	⚡	\$128.6
Transit 2	⚡		⚡	⚡	\$131.4
Arterials				⚡	\$107.0
Freeways		⚡		⚡	\$122.6

Note: "⚡" indicates that the alternative meets or surpasses the performance measures established for the respective category.

Elected official participation/public involvement

The scenarios were developed primarily by agency staff.

Resulting actions

The agency board adopted a series of transportation improvements developed through an iterative scenario development process. The land use component of the preferred alternative is the pattern in the Concentrated scenario.

The MPO, working with area local governments, has created a Land Use-Transportation Decision Support System (DSS), a software tool that allows local citizens and policy makers to examine various relationships between land use and transportation. Through the DSS, users can examine in a cross-sectional analysis potential impacts at a site plan level, or longitudinally at the regional level. More information about the DSS is available at www.ccmppo.org/activities/Modeling/dss.html.

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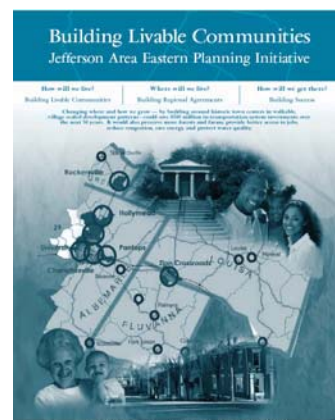
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Jefferson Area Eastern Planning Initiative

Sponsor: Thomas Jefferson Planning District Commission

Completion Date: 2002 **Planning Horizon:** 2050

Source: Building Livable Communities: Jefferson Area Eastern Planning Initiative
http://www.tjpd.com/pdf/rep_comm_epiBrochure.pdf



Concerns about the impacts of rapid growth helped to spawn the Eastern Planning Initiative. Of particular concern were potential impacts on historical and environmental values.

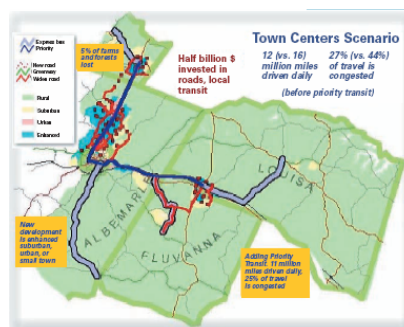
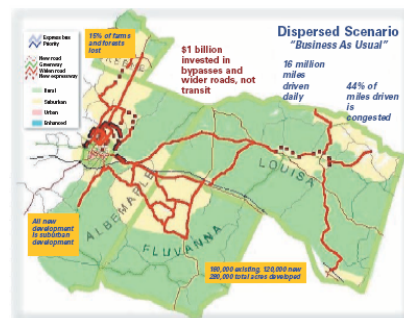
The nature of the scenarios

The project crafted and assessed three scenarios:

Dispersed: assumes recent development trends continue, supplemented by a large network of wider roads and bypasses.

Town Centers: concentrates growth at major crossroads and includes a pedestrian-friendly street network and extensive expansion of the transit system.

Urban Core: clusters growth around existing villages and towns and includes transportation enhancements similar to the Town Centers scenario.



The evaluation process

The scenarios were assessed for their impacts on land uses, transportation, energy consumption, and water quality/quantity.

Participants helped develop 17 existing community types, or “elements” that were then used to build the study scenarios. Key to the project’s success was the use of the CorPlan spreadsheet model. The model’s simplicity and transparency helped to build confidence among area stakeholders in the eventual project results.

Evaluation results

The Dispersed scenario had the greatest impacts on the values measured. Public reaction to that option at the meetings and workshops was consistently negative.

HOW THE SCENARIOS COMPARE			
PERFORMANCE MEASURE/ <i>Sustainability Accord(s) Goals (in italics)</i>	DISPERSED	TOWN CENTERS	URBAN CORE
Percent Farms & Forests <i>Retain resources/habitat/farms/forests</i>	55 %	64 %	65 %
Percent Developed <i>Retain resources/habitat/farms/forests</i>	45	36	35
Percent Living in Clustered Communities <i>Optimize use/human scale</i>	13	61	68
Percent Non-Auto Trips <i>Transportation Alternatives</i>	4	15	18
Annual Gallons Gas Consumed (billions) <i>Conserve Energy</i>	155	121	110
Percent Travel Congested <i>Employment/Education Access</i>	44	27	20
Water Quality & Quantity <i>Water Quality & Quantity</i>	Poor	Good	Good

Elected official participation/public involvement

An advisory committee comprised of elected officials, residents, and leaders from business and interest groups helped to steer the project. The group met 11 times and hosted four public workshops during the process.

Resulting actions

Several county planning processes in the Charlottesville area have begun incorporating themes and principles (“key success factors”) from the EPI into local planning and regulatory documents. The EPI also provided the basis for a regional transportation planning process (UnJAM 2025).

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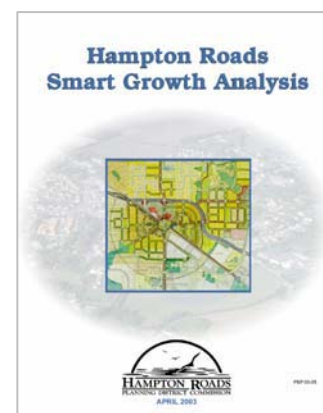


Hampton Roads Smart Growth Analysis

Sponsor: Hampton Roads Planning District Commission

Completion Date: 2003 **Planning Horizon:** 2026

Source: Hampton Roads Smart Growth Analysis (April 2003)
<http://www.hrpdc.org/publications/specialreports/HR%20SG%20rpt.pdf>



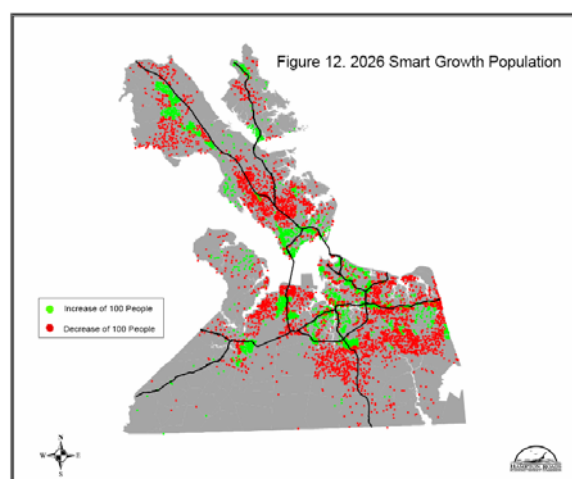
The Smart Growth Analysis was developed “to examine the ramifications of a compact, nodal development pattern on transportation and air quality issues.”

The nature of the scenarios

The study used two scenarios:

Traditional: assumes continuation of recent development/transportation trends.

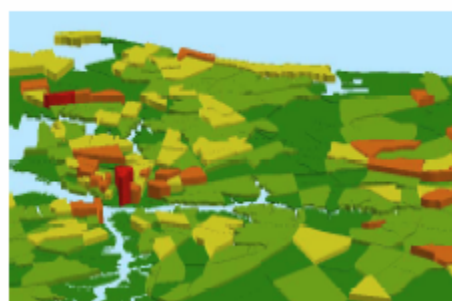
Smart Growth: assumes a shift of 20% of future growth from suburban areas to the central city into transit-oriented developments.



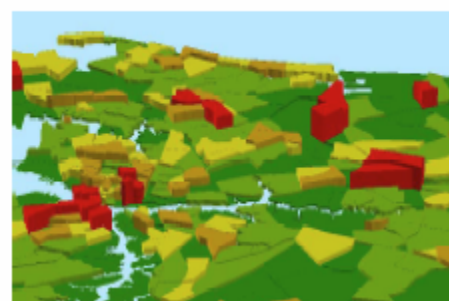
The evaluation process

The project used the region’s usual travel demand/mobile emission modeling system to test the scenarios for their impacts on transportation and air quality.

Traditional Population Density



Smart Growth Population Density



Evaluation results

The Smart Growth scenario was less auto-reliant, with differences in the 4-5% range for most measures. The scenario would increase transit ridership 22%, but off of a rather small base. Peak hour travel speeds would increase less than 1%.

	TRADITIONAL	SMART GROWTH	CHANGE	% CHANGE
VTM per day	39.0 million	37.2 million	- 1.8 million	- 4.6%
Peak Hour Speed	30.60 mph	30.84 mph	+ 0.24 mph	+ 0.8%
Auto Trips per day	4.16 million	4.11 million	- 50,000	- 1.2%
Bus Trips per day	30,000	36,600	+ 6,600	+ 22.0%
NOx per day	60.55 tons	57.96 tons	- 2.59 tons	- 4.3%
VOC per day	41.93 tons	39.80 tons	-2.13 tons	- 5.1 %

Elected official participation/public involvement

The project was fundamentally a staff driven process, with only limited outside input.

Resulting actions

The project was not intended to result in any concrete policy or institutional changes in the region: "The development of a 'smart growth' alternative is intended primarily as an academic exercise to evaluate the theoretical impact of utilizing transit oriented design concepts to accommodate future population and employment growth in Hampton Roads."

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Vision 2020: Growth Strategy and Transportation Plan for the Central Puget Sound Region

Sponsor: Puget Sound Council of Governments

Completion Date: 1990 **Planning Horizon:** 2020

Source: Vision 2020 Final Environmental Impact Statement (Sept 1990)
<http://www.psrc.org/projects/vision/vision2020.htm>



The Vision 2020 project was created in response to concerns about rapid population growth in the Puget Sound region, and the impacts that might have on open space, fiscal expenditures, air quality, and automobile dependence. The project was designed to provide the basis for an update of the region's long-range transportation plan. It began in 1987 as two separate planning processes, focused on transportation and regional development, respectively; the two efforts were combined late in 1988.

The nature of the scenarios

The project produced five initial scenarios for study and public outreach/input. A sixth was developed for adoption as the preferred scenario.

No Action: assumes no regional policy on growth, and a continuation of recent development trends, with much of the growth gravitating to highway corridors and interchanges; curtails expansion of all transportation systems.

Existing Plans: assumes the continuation of existing local government plans, with employment growth focused on office parks and shopping malls, and housing growth focused in suburban fringe areas; transportation investments focus on new rail systems and moderate demand management policies are incorporated.

Major Centers: concentrates new employment growth in a few major urban centers, and housing growth in moderate density areas surrounding high-capacity transit corridors and stations; includes a heavy emphasis on transit investments and a vigorous demand management policy package.

Multiple Centers: concentrates housing and employment growth in a large number of centers of various sizes containing a balance of housing, jobs, and retail; transit investment is emphasized to a somewhat lesser degree than the Major Centers scenario.

Dispersed Growth: continues current market trends toward dispersal of jobs and housing, supported by regional policies to reduce growth in congested areas through limits or caps; transportation funding focuses on new radial and circumferential highways systems.

Preferred: a combination of the Major Centers and Multiple Centers scenarios; contains future urbanization and concentrates new employment growth into 10-15 centers of various magnitudes; higher-density housing is located near planned new investments in transit; includes major demand management policies.

The evaluation process

The indices used in the project included land use, mobility, housing supply and cost, public service costs, water resources, energy, historic resources, air quality, noise, and natural hazards.

The project utilized a land use model, as well as a transportation demand model. The degree of feedback between models is not specified.

Evaluation results

The Major Centers scenario had the lowest VMT levels, and the highest levels of transit ridership and congestion (other than the No Action). The figures for energy consumption and fiscal costs did not vary greatly across scenarios. Land consumption was lowest for the Multiple Centers scenario—less than half the amount for the Dispersed Growth scenario.

Scenarios	Daily VMT	Vehicle Hours Delay	% Transit Work Trips	Additional Open Space Consumed (sq. mi.)
No Action	98,800,000	1,760,000	7.8	750
Existing Plans	98,100,000	830,000	12.8	750
Major Centers	94,100,000	960,000	14.8	450
Multiple Centers	96,600,000	810,000	12.2	400
Dispersed Growth	100,700,000	820,000	6.9	950
Preferred	95,400,000	840,000	14.1	400

Elected official participation/public involvement

A series of “public symposia” were held early in the process to identify regional growth and development issues. This was followed by several “summit meetings” of elected officials and a series of workshops that used small group brainstorming sessions to identify and modify scenarios for study. Newspaper tabloid inserts were used to disseminate information about the scenarios and their relative impacts. Public hearings, open houses, and community meetings were used to provide the feedback that led to the creation of the preferred scenario.

Resulting actions

The Preferred scenario was the basis for the Vision 2020 Growth and Transportation Strategy, which was adopted as the official development and transportation plans for the region. This strategy was updated in 1995. A process to further update the plan, and extend it through 2040, was initiated in 2003. Consistency between the Vision 2020 growth and transportation plans and local government planning documents is facilitated by the state Growth Management Act, which empowers the Puget Sound Regional Council (successor to the sponsor of the original 1990 study) to certify consistency between local plans and the regional transportation plan.

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Year 2020 Sheboygan Area Transportation Plan

Sponsor: Bay-Lake Regional Planning Commission

Completion Date: 1996 **Planning Horizon:** 2020

Source: Year 2020 Sheboygan Area Transportation Plan (Dec 1996)

This analysis was done as part of an update to the region's long-range transportation plan.

The nature of the scenarios

The study used three scenarios:

Scenario 1 – Continuation of Existing Trends: assumes that new development will follow the recent development pattern of low-density, fragmented, noncontiguous development.

Scenario 2 – Compact or Infill Development: assumes that development takes place in a more compact fashion at higher densities.

Scenario 3 – Corridor Development: assumes that development will occur at low to medium densities along major transportation corridors.

The evaluation process

The study utilized the region's regular travel demand forecasting system to test the scenarios for their relative impacts on the transportation system function.

Evaluation results

The Compact scenario resulted in the lowest increases in vehicle miles and hours of travel, trip lengths, congestion levels, and fuel consumption.

Scenarios	Daily VMT	Av. Trip Length (mins.)	Daily Vehicle Hours Travel	% of System Congested (>100% cap.)
Continuation of Existing Trends	1,620,682	11.68	57,816	0.82%
Compact or Infill Development	1,612,678	11.62	57,127	0.60%
Corridor Development	1,641,479	11.93	58,649	0.97%

Elected official participation/public involvement

The three scenarios were primarily developed by agency staff, with input from the MPO technical and policy advisory committees.

Resulting actions

The agency adopted the Compact or Infill Development scenario as the preferred option, and used it as the basis for the rest of the plan update. Interestingly, one of the reasons for adopting this scenario was its compatibility with existing local community comprehensive plans.

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Appendix A

Other Projects

In the course of this research, we became aware of a number of projects, in addition to those listed in this document, for which we could not obtain sufficient information. A few of those projects are listed here.

- Cumberland Region Tomorrow, *Vision 2020—Regional Visioning Project*
- Metropolitan Washington Council of Governments, *Regional Mobility and Accessibility Study*
- North Central Texas Council of Governments, *Mobility 2030 Alternative Futures*
- Utah Department of Transportation, *Legacy Parkway Supplemental Environmental Impact Statement*

Appendix B

Web Links to Scenario Planning Reports

As mentioned in the introduction, many of the documents referred to in the bibliography can be found at a digital library created as part of this project:

<http://content.lib.utah.edu/cgi-bin/browserresults.exe?CISOROOT=%2FFHWA>

Some of the documents contained in the library can also be found at the following links on the web.

Arizona

City of Phoenix, AZ, North Land Use Plan:

<http://www.ci.phoenix.az.us/pub/PLANNING/nlup.pdf>

Maricopa Association of Governments, MAG Regional Transportation Plan: Mobility for the New Millennium:

Alternative Growth Concepts—Draft Task Report (Feb 2003):

<http://www.mag.maricopa.gov/pdf/cms.resource/AlternativeGrowthConceptsFinal.pdf>

Analysis of Alternative Growth Concepts—Draft Task Report (Feb 2003):

<http://www.mag.maricopa.gov/pdf/cms.resource/AnalysisofGrowthConcepts.pdf>

City of Flagstaff & Coconino County, AZ, *Flagstaff Area Regional Land Use and Transportation Plan*:

<http://www.flagstaff.az.gov/documents%5CCommunity%20Development%5CRegional%20Plan/Regional%20Plan%202003.pdf>

California

Bay Area Alliance for Sustainable Development, CA, *Smart Growth Strategy/Regional Livability Footprint Project*:

Final Report:

http://www.abag.ca.gov/planning/smartgrowth/Publications/Final%20Report/SmartGrowthRpt_final.pdf

Alternatives Report:

<http://www.abag.ca.gov/planning/smartgrowth/Publications/AltsReport/SmartGrowthStrategy.pdf>

Alameda County, CA Planning Department, *North Livermore: Last Change for Smart Growth*:

<http://www.transcoalition.org/archives/forum/i/northlivermore.pdf>

Contra Costa County, CA, *Shaping Our Future*:

http://www.shapingourfuture.org/docs/SOF_Report.pdf

Southern California Association of Governments, *Southern California Compass*:

<http://www.socalcompass.org/about/report/pdf/fullreport.pdf>

Sacramento Area Council of Governments & Valley Vision, *Sacramento Region Blueprint*:

http://www.sacregionblueprint.org/sacregionblueprint/your_involvement/wrapup.cfm

San Diego Association of Governments, *San Diego Growth Alternatives Study*:

<http://www.energy.ca.gov/places/PLACESGB.PDF>

San Diego Association of Governments, *Vista Transit Focus Area Study*:

<http://www.energy.ca.gov/places/PLACESGB.PDF>

Colorado

City & County of Denver, *Blueprint Denver*:

http://www.denvergov.org/Blueprint_Denver/Blueprint/Blueprint%20Denver/start_TOC.pdf

District of Columbia

Chesapeake Bay Foundation & Environmental Defense Fund, *A Network of Livable Communities*:

http://www.environmentaldefense.org/documents/746_networkof.PDF

Delaware

Wilmington Area Planning Council & Fox Point Association, *Edgemoor, Delaware Transit Oriented Development Analysis*:

<http://www.wilmapco.org/edgemoor/edgemoor%20TOD%20report.PDF>

Wilmington Area Planning Council, *Regional Transportation Plan 2025: Opening the Door to Change*:

<http://www.wilmapco.org/RTP/RTP.pdf>

Florida

Treasure Coast Regional Planning Council, *Martin & St. Lucie Counties Regional Land Use Study*:

Table of Contents:

http://www.tcrpc.org/regional_lu/regional_land/phase_1_final_report/table_of_contents.pdf

Executive Summary:

http://www.tcrpc.org/regional_lu/regional_land/phase_1_final_report/executive_summary.pdf

Chapter 1:

http://www.tcrpc.org/regional_lu/regional_land/phase_1_final_report/chapter_1.pdf

Chapter 2:

http://www.tcrpc.org/regional_lu/regional_land/phase_1_final_report/chapter_2.pdf

Chapter 3:

http://www.tcrpc.org/regional_lu/regional_land/phase_1_final_report/chapter_3.pdf

Chapter 4:

http://www.tcrpc.org/regional_lu/regional_land/phase_1_final_report/chapter_4.pdf

App. A – Public Involvement:

http://www.tcrpc.org/regional_lu/regional_land/phase_1_final_report/appendix_a.pdf

METROPLAN Orlando, *Community Connections: A Transportation Vision for the Next 25 Years*:

Summary Report/Technical Report No. 5:

http://www.metroplanorlando.com/2025_lrt/TR_5_Summary%20Report%20Adopted_Sept_04.pdf

Georgia

U.S. Environmental Protection Agency, *17th Street Extension and Atlantic Steel Redevelopment Project*:

<http://www.epa.gov/projectxl/atlantic/assessment.pdf>

Georgia Regional Transportation Authority, *Northern Sub-Area Study*

http://207.101.65.114/info_center/default.asp

Executive Summary:

http://207.101.65.114/info_center/final_report/exec_summary.pdf

Chapter 3: Land Use:

http://207.101.65.114/info_center/final_report/Chapter%203%20-%20Land%20Use.pdf

Chapter 5: Evaluation:

http://207.101.65.114/info_center/final_report/Chapter%205%20-%20Evaluation.pdf

Appendix D: Findings and Conclusions from Initial Scenario

http://207.101.65.114/info_center/final_report/D%20-%20Findings%20and%20Conclusions%20from%20Initial%20Scenarios.pdf

Appendix E: Alternatives Description Summary

http://207.101.65.114/info_center/final_report/E%20-%20Alternatives%20Description%20Summary.pdf

Appendix L: Land Use Assignments

http://207.101.65.114/info_center/final_report/L%20-%20Land%20Use%20Assignments.pdf

Illinois

Environmental Law and Policy Center, *Crossroads*:

<http://www.elpc.org/trans/toll/crossroadsIImarshallreport996.pdf>

Montgomery County, MD, *Transportation Policy Task Force Report*:

http://www.mc-mncppc.org/move/new_report/final_report_draft.pdf

Maryland

Chesapeake Bay Program, *Chesapeake Futures*:

Summary:

<http://www.chesapeake.org/stac/FutSummary.pdf>

Chapter 5: Development and Sprawl

<http://www.chesapeake.org/stac/FutChap10.pdf>

Chapter 10: Chesapeake Choices

<http://www.chesapeake.org/stac/FutChap10.pdf>

Baltimore Regional Council of Governments, *Impacts of Land Use Alternatives on Transportation Demand*:

<http://tmip.fhwa.dot.gov/clearinghouse/docs/landuse/ufti/ch2.stm>

Baltimore Regional Transportation Board, *Vision 2030*:

<http://www.baltometro.org/V2030/V2030report.pdf>

Minnesota

Center for Energy and Environment, Minnesotans for an Energy Efficient Economy, and 1000 Friends of Minnesota, *Two Roads Diverge: Analyzing Growth Scenarios for the Twin Cities Region*:

<http://www.me3.org/sprawl/finalreport.pdf>

Metropolitan Council, MN, *Smart Growth Twin Cities*:

<http://www.calthorpe.com/Project%20Sheets/SGTC.pdf>

Missouri

Mid-America Regional Council (Kansas City, MO), *Smart Choices: Understanding the Cost of Development*:

<http://www.marc.org/Community/codreport.pdf>

North Carolina

Greater Triangle Regional Council, Triangle J Council of Governments, *Regional Development*

Choices:

<http://www.tjcog.dst.nc.us/rdc2.htm>

New Jersey

New Jersey Office of State Planning, *Impact Assessment of the New Jersey Interim State Development and Redevelopment Plan* (1992):

<http://www.nj.gov/dca/osg/plan/impact.html>

Executive Summary

<http://www.nj.gov/dca/osg/docs/iaexecsumm022892.pdf>

Research Findings Summary:

<http://www.nj.gov/dca/osg/docs/iafindingscover022892.pdf>

Supplemental Findings Summary:

<http://www.nj.gov/dca/osg/docs/iasuppcover043092.pdf>

New Jersey Office of State Planning, *The Costs and Benefits of Alternative Growth Patterns: The Impact Assessment of the New Jersey State Plan* (2000):

<http://www.nj.gov/dca/osg/plan/impact.html>

Executive Summary:

<http://www.nj.gov/dca/osg/docs/iaexecsumm090100.pdf>

Middlesex Somerset Mercer Regional Council (now The Regional Planning Partnership), *The Impact of Various Land Use Strategies on Suburban Mobility*:

<http://ntl.bts.gov/DOCS/470.html>

New Mexico

City of Albuquerque, *Planned Growth Strategy Findings Report*:

<http://www.cabq.gov/council/pgs.html>

Part I: Findings:

<http://www.cabq.gov/council/pdf/Part1.pdf>

Part II: Preferred Alternative

<http://www.cabq.gov/council/pdf/Part2.pdf>

New York

Capital District Transportation Committee (Albany, NY), *NY 5 Study*:

<http://www.ny5.org/index.html>

Ohio

Mid-Ohio Regional Planning Commission (Columbus, OH), *Regional Growth Strategy – Regional Connections*:

<http://www.regionalconnections.org/Library/RegionalFactBook-web.pdf>

Oregon

City of Albany, Oregon, *Balanced Development Patterns Project*:

Project Website:

<http://www.cityofalbany.net/communitydevelopment/balanceddev/index.html>

Development Alternatives Memo:

<http://www.cityofalbany.net/communitydevelopment/balanceddev/pdf/DevelopmentAlternatives.pdf>

City of Salem, Oregon, *Salem Futures*:

Project Website:

<http://www.cityofsalem.net/~futures/>

Evaluation Criteria Memo:

<http://www.cityofsalem.net/~futures2/4EvalC.pdf>

Phase I Report: Alternatives:

<http://www.cityofsalem.net/~futures2/phase1fr.pdf>

Evaluation Results Memo:

<http://www.cityofsalem.net/~futures2/eval%20criteria%201ab%20final.pdf>

Metro (Portland, OR), *Region 2040*:

2040 Project History:

http://www.metro-region.org/library_docs/land_use/2040history.pdf

Pacific Northwest Ecosystem Research Consortium, *Willamette Basin Alternative Futures Analysis*:

Project Website:

http://www.fsl.orst.edu/pnwerc/wrb/Atlas_web_compressed/PDFtoc.html

Project Summary:

http://www.fsl.orst.edu/pnwerc/wrb/proj_summary.pdf

1000 Friends of Oregon, *Making the Land Use, Transportation, Air Quality Connection (LUTRAQ)*:

LUTRAQ Vol. 3: Description of Alternatives

LUTRAQ Vol. 5: Analysis of Alternatives
LUTRAQ Vol. 7: Summary Report
http://www.friends.org/resources/lut_reports.html

Rogue Valley Council of Governments, *Transit Oriented Design and Transit Corridor Development Strategies Project*:
Technical Memorandum #5: *Travel Demand Modeling of Land Use Alternatives*
http://www.rvcog.org/pdf/Planning_TOD_Land_Use_Tech_Memo.pdf

South Carolina

Catawba Regional Council of Governments (SC), *Integrated Infrastructure Planning Project*:
http://www.ors2.state.sc.us/tcsp/pdf/catawba_tcsp.pdf

Pee Dee Regional Council of Governments, *Planning Implications of Alternate Development Patterns on Infrastructure and Existing Planning Policies*:
http://www.ors2.state.sc.us/tcsp/pdf/peedee_tcsp.pdf

Santee-Lynches Regional Council of Governments (SC), *Santee-Lynches Regional Infrastructure Plan*:
http://www.ors2.state.sc.us/tcsp/pdf/SL_plan.pdf

Tennessee

Oak Ridge National Laboratory, *Oak Reservation Land Use Planning Process*:
http://landuseplanning.ornl.gov/technical_report/UT-B_Final_Land_Use_Report.pdf

Texas

Envision Central Texas, *Envision Central Texas*:
<http://www.envisioncentraltexas.org/resources.php>
Scenario Summaries:
http://www.envisioncentraltexas.org/resources/3_Scenario_Summaries_v2.pdf
Appendix V: Indicator Matrix:
http://www.envisioncentraltexas.org/resources/7_Appendix_5.pdf

North Central Texas Council of Governments, *Urban Form/Transportation System Options for the Future*:
DeCorla-Souza, Patrick, "The Impacts of Alternative Urban Development Patterns on Highway System Performance,"
<http://tmip.fhwa.dot.gov/clearinghouse/docs/landuse/ufti/ch2.stm>

Utah

Coalition for Utah's Future, *Envision Utah*:

The History of Envision Utah

<http://ftp.envisionutah.org/HistoryofEnvisionUtah.pdf>

QGET, Scenario Analysis: Executive Summary

http://governor.utah.gov/dea/Publications/Info_Brief.pdf

QGET, Strategy Analysis (May 2000)

<http://governor.utah.gov/dea/Publications/StrategyALL.pdf>

Virginia

Thomas Jefferson Planning District Commission (Charlottesville, VA), *Jefferson Area Eastern Planning Initiative*:

Building Livable Communities: Jefferson Area Eastern Planning Initiative:

http://www.tjpdcc.org/pdf/rep_comm_epiBrochure.pdf

Hampton Roads Planning District Commission (VA), *Hampton Roads Smart Growth Analysis*:

<http://www.hrpdc.org/publications/specialreports/HR%20SG%20rpt.pdf>

Vermont

Chittenden County Metropolitan Planning Organization (VT), *2025 Chittenden County Metropolitan Transportation Plan*:

http://www.ccmpo.org/MTP/MTP_final_dec2004.pdf

Miscellaneous

Looking Forward: A Web Resource for Foresight in Government

<http://wwics.si.edu/subsites/lookingforward/links/environment.htm>